C21.5: 962/2

Vol. 962 Number 2

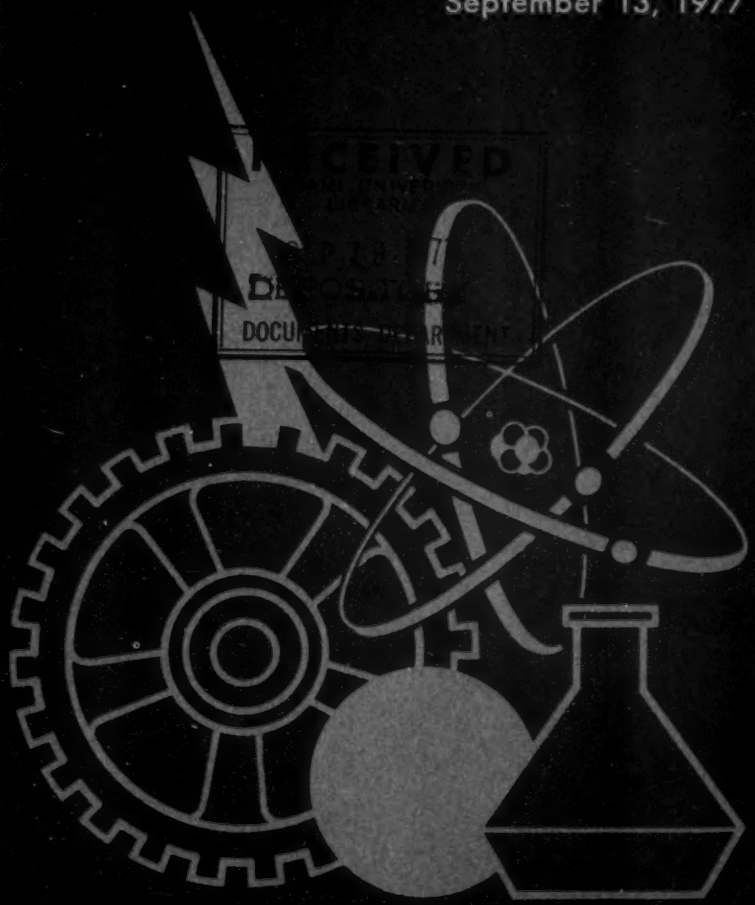
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

September 13, 1977



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

September 13, 1977 Volume 962 Number 2

CONTENTS

	Page
Patent and Trademark Notices	
Reissue Applications Filed	962 OG 10
Patent Notices	
Certificates of Correction for the Week of September 13, 1977	962 OG 11
Disclaimers	962 OG 11
Condition of Patent Applications	962 OG 12
Reissue Patents Granted (29,392)	479
Plant Patents Granted (4,101)	483
Patents Granted	
General and Mechanical (4,047,249)	485
Chemical (4,047,887)	699
Electrical (4,048,436)	849
Design Patents Granted (245,731)	929
Index of Patentees	PI 1
Indices of Reissues, Plants and Designs	PI 48
Classification of	
Patents (Including Reissues)	PI 51
Designs and Plants	PI 54
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 55
Designs and Plants	PI 57
Change of Address Form and Subscription Order Form	Back Page

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PATENT AND TRADEMARK OFFICE NOTICES

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

D. 237,758, Re. S.N. 815,867, Filed July 14, 1977, Cl. D2/244, EYE SHADE WITH REMOVABLE CROWN, Erline L. Huffman, Owner of Record: *Inventor,* Attorney or Agent: Claude A. Patalidis, et al., Ex. Gp.: 290

3,499,685, Re. S.N. 807,026, Filed June 16, 1977, Cl. 299/86, PICK-TYPE MINING BIT WITH SUPPORT BLOCK HAVING ROTATABLE SEAT, Thomas J. Kniff, Owner of Record: *Kennametal Inc., Latrobe, Pa.,* Attorney or Agent: Lawrence R. Burns, Ex. Gp.: 354

3,554,132, Re. S.N. 816,505, Filed July 18, 1977, Cl. 104/172, VEHICLE CONVEYOR, Daniel C. Hanna, et al., Owner of Record: *Inventors,* Attorney or Agent: Kenneth S. Klarquist, et al., Ex. Gp.: 314

3,622,049, Re. S.N. 816,246, Filed July 18, 1977, Cl. 222/190, DISPENSING SYSTEM, Robert E. Thompson, Owner of Record: *Schering Corporation, Bloomfield, N.J.,* Attorney or Agent: Vincent H. Gifford, Ex. Gp.: 311

3,632,582, Re. S.N. 806,976, Filed June 16, 1977, Cl. 260/278, PROCESS FOR PREPARING NITRO-P-PHENYLENEDIAMINES, Milos S. Bil, Owner of Record: *Clairol Inc., New York, N.Y.,* Attorney or Agent: Irving Holtzman, et al., Ex. Gp.: 117

3,801,507, Re. S.N. 812,940, Filed July 5, 1977, Cl. 252/42 F, SULFURIZED METAL PHENATES, Yngve Gust Hendrickson, et al., Owner of Record: *Chevron Research Company, San Francisco, Calif.,* Attorney or Agent: J. A. Buchanan, Jr., et al., Ex. Gp.: 116

3,859,332, Re. S.N. 816,226, Filed July 18, 1977, Cl. 260/471 C, O-(HALOPHENYLCARBAMYL)-N-(HALOPHENYL) GLYCOLAMIDES, Don R. Baker, Owner of Record: *Stauffer Chemical Company, New York, N.Y.,* Attorney or Agent: Edwin H. Baker, et al., Ex. Gp.: 127

3,895,049, Re. S.N. 815,352, Filed July 12, 1977, Cl. 260/465.3, CATALYST AND PROCESS FOR OXIDATION OR AMMOXIDATION OF OLEFIN MIXTURE, Sumio Umemura, et al., Owner of Record: *Ube Industries, Limited, Ube-Shi, Yamaguchi-Ken, Japan,* Attorney or Agent: Eric H. Waters, et al., Ex. Gp.: 124

3,895,280, Re. S.N. 815,674, Filed July 14, 1977, Cl. 318/610, ELECTRONIC CONTROLLER WITH REMOTE TUNING, Neal D. Peterson, Owner of Record: *The Foxboro Company, Foxboro, Mass.,* Attorney or Agent: Howard M. Bollinger, et al., Ex. Gp.: 217

3,895,778, Re. S.N. 815,989, Filed July 15, 1977, Cl. 254/1, METHOD OF LOWERING AND RAISING LOADS BY MEANS OF A JACK ASSEMBLY AND LIFTING ELEMENT, Nils Harald Ahlgren, Owner of Record: *Inventor,* Attorney or Agent: Howard L. Rose, et al., Ex. Gp.: 323

3,903,502, Re. S.N. 808,800, Filed June 22, 1977, Cl. 340/146.3 SY, CHARACTER RECORDING SYSTEM, David Moss, Owner of Record: *Creative Ventures, Inc., Dayton, Ohio,* Attorney or Agent: Lawrence B. Biebel, et al., Ex. Gp.: 237

3,915,498, Re. S.N. 816,798, Filed July 18, 1977, Cl. 299/2, OIL SHALE RETORT FLUE GAS COOLING AND CLEANING, Robert S. Burton III, et al., Owner of Record: *Occidental Petroleum Corporation, Los Angeles, Calif.,* Attorney or Agent: Robert L. Parker, et al., Ex. Gp.: 354

3,931,922, Re. S.N. 811,834, Filed June 30, 1977, Cl. 228/6, APPARATUS FOR MOUNTING SEMICONDUCTOR DEVICES, Sydney Jackson, et al., Owner of Record: *Ferranti Limited, Hollinwood, England,* Attorney or Agent: Edward J. Kondracki, Ex. Gp.: 323

3,937,994, Re. S.N. 814,238, Filed July 8, 1977, Cl. 310/168, MAGNETIC SPEED SENSOR, Rex Wallace Presley, et al., Owner of Record: *The Bendix Corporation, South Bend, Ind.,* Attorney or Agent: Ken C. Decker, et al., Ex. Gp.: 212

3,973,421, Re. S.N. 815,259, Filed July 13, 1977, Cl. 70/364 R, KEY CONTROLLED SECURITY APPARATUS, George P. Patriquin, Owner of Record: *Hudson Lock, Inc., Hudson, Mass.,* Attorney or Agent: John E. Toupal, Ex. Gp.: 351

PATENT NOTICES

Certificates of Correction for the Week of Sept. 13, 1977

Re. 29,037	3,833,640	3,980,253	3,999,961	4,012,625	4,020,303	4,024,358	4,028,533
Re. 29,116	3,833,656	3,987,291	4,000,076	4,013,249	4,020,389	4,024,497	4,028,977
Re. 29,228	3,839,409	3,989,387	4,000,374	4,013,446	4,020,654	4,025,192	4,029,091
Re. 29,256	3,847,966	3,989,873	4,001,367	4,013,768	4,020,656	4,025,218	4,029,244
Re. 29,265	3,859,255	3,992,599	4,001,449	4,014,068	4,020,864	4,025,339	4,029,347
Re. 29,271	3,879,257	3,994,239	4,001,543	4,014,134	4,021,036	4,025,367	4,029,561
D. 243,196	3,879,437	3,994,427	4,001,621	4,014,258	4,021,060	4,025,576	4,029,688
D. 243,197	3,879,439	3,994,974	4,002,218	4,014,428	4,021,359	4,025,640	4,030,163
D. 243,198	3,897,208	3,995,333	4,002,702	4,014,725	4,021,390	4,025,841	4,030,176
D. 243,199	3,904,126	3,995,356	4,003,495	4,014,784	4,021,563	4,025,892	4,030,177
D. 243,200	3,917,864	3,995,641	4,004,237	4,014,894	4,021,934	4,025,901	4,030,342
D. 244,491	3,925,450	3,995,767	4,005,347	4,015,582	4,022,024	4,025,995	4,030,613
3,612,753	3,925,459	3,995,811	4,005,795	4,015,617	4,022,063	4,026,050	4,030,990
3,678,095	3,925,805	3,995,864	4,005,995	4,015,660	4,022,085	4,026,215	4,031,042
3,681,364	3,944,651	3,995,865	4,006,141	4,015,999	4,022,174	4,026,396	4,031,519
3,701,046	3,950,363	3,996,082	4,006,181	4,016,240	4,022,207	4,026,505	4,032,143
3,761,401	3,952,048	3,996,132	4,006,198	4,016,257	4,022,375	4,026,733	4,032,144
3,766,086	3,955,213	3,996,170	4,006,602	4,017,173	4,022,672	4,026,740	4,032,150
3,767,466	3,959,171	3,996,200	4,007,135	4,017,508	4,023,177	4,027,039	4,032,162
3,784,636	3,961,746	3,996,291	4,007,179	4,017,955	4,023,704	4,027,211	4,032,489
3,794,664	3,962,058	3,996,357	4,007,189	4,018,046	4,023,791	4,027,338	4,032,516
3,796,740	3,969,728	3,996,420	4,007,826	4,018,364	4,023,976	4,027,689	4,032,845
3,798,269	3,974,147	3,996,460	4,008,400	4,018,387	4,023,977	4,027,854	4,032,881
3,813,784	3,975,932	3,998,043	4,010,204	4,018,702	4,024,014	4,028,000	
3,816,508	3,976,746	3,998,972	4,011,689	4,018,914	4,024,118	4,028,127	
3,817,937	3,978,428	3,999,449	4,012,138	4,019,813	4,024,152	4,028,200	
3,823,119	3,979,117	3,999,468	4,012,349	4,019,927	4,024,212	4,028,469	

Disclaimers

3,958,225.—*Kenneth W. Turner,* Des Plaines, and *George C. Zobel,* Palatine, Ill. APPARATUS AND METHOD FOR CONSTROLLING A COMMUNICATIONS TERMINAL. Patent dated May 18, 1976. Disclaimer filed Apr. 18, 1977, by the assignee, *Teletype Corporation.*

Hereby enters this disclaimer to claim 6 of said patent.

3,958,824.—*Roy E. Crews,* Allison Park, and *Eugene D. Legg,* West Newton, Pa. LIFTING FRAME AND METHODS OF LIFTING PREFABRICATED BUILDING MODULES. Patent dated May 25, 1976. Disclaimer filed July 19, 1977, by the assignee, *Westinghouse Electric Corporation.*

Hereby enters this disclaimer to the remaining term of said patent.

4,003,145.—*Anton Liebscher,* Waynesville, *Sven Oberg,* Lake Junaluska, and *Kenneth Smatjers* and *Horace Auberry,* Waynesville, N.C. FOOTWEAR. Patent dated Jan. 18, 1977. Disclaimer filed July 18, 1977, by the assignee, *Ro-Search, Inc.*

Hereby enters this disclaimer to claim 1 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 2, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-23-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-3-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-19-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	4-8-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-28-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-14-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-12-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	11-17-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-14-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-29-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-14-70
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-24-76

Expiration of patents: The patents within the range of numbers indicated below expire during July 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,943,327 to 2,947,000, inclusive
Plant Patents..... Numbers 1,957 to 1,962, inclusive

REISSUES

SEPTEMBER 13, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,392

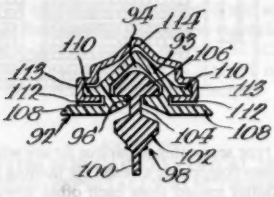
WINDSHIELD WIPER BLADE STRUCTURE

John P. Moorhead, Palos Verdes, Calif., and Donald W. Stratton, St. John, Ind., assignors to The Anderson Company, Gary, Ind.

Original No. 3,820,188, dated June 28, 1974, Ser. No. 328,649, Feb. 1, 1973. Application for reissue June 11, 1976, Ser. No. 695,066

Int. Cl.[2] B60S *1/04, 1/38*

U.S. Cl. 15—250.42 **21 Claims**



18. An elongate backing member adapted to be attached to a superstructure for holding a flexible windshield wiping element, comprising,

a. a tubular receiver having a longitudinal chamber for holding a retention bead on said wiping element,

b. the bottom of the receiver having a relatively narrow longitudinal slot opening into the chamber,

c. a pair of opposed flanges extending laterally outwardly in opposite directions from the receiver, and

d. a second pair of opposed flanges extending laterally outwardly in opposite directions on the receiver in vertically spaced relation above said first flanges to define laterally opening slots for receiving the claws of a superstructure.

Re. 29,393

APPARATUS FOR SEPARATING AND/OR COUNTING INDIVIDUAL ELEMENTS OF A PLURALITY

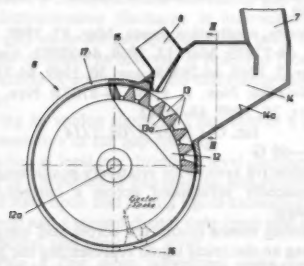
Reinhard Becker, Gieselwerder, Germany, assignor to Deere & Company, Moline, Ill.

Original No. 3,715,057, dated Feb. 6, 1973, Ser. No. 206,282, Dec. 9, 1971. Application for reissue Jan. 28, 1974, Ser. No. 437,179

Claims priority, application Germany, Dec. 29, 1970, 2064336

Int. Cl.[2] A01C *7/04*

U.S. Cl. 221—211 **29 Claims**



1. Apparatus for separating and counting individual ones of a plurality of substantially similar shaped particles, elements, grains, or the like, such as grains of seed, pills, etc., and including a rotating drum, feeder means for the particles and a housing for the drum, the improvement comprising:

the drum being hollow and [constructed to have plural] *having in its outer surface a plurality of* inwardly tapering indentations, *each indentation* terminating in a bore open to the interior of the drum and having at the bottom of the indentation dimensions smaller than the particles so that the particles cannot traverse the bore, the [indentations] *indentation* being wider than the particles at the surface of the drum, the indentation dimensioned to hold [at least] *therein more than* one particle each;

means including a nozzle for directing [an] *a defined* air jet towards the drum at direction and position so that the air jet is directed towards and into [an indentation] *successive indentations* striking along the leading wall [portion] *portions* thereof as the drum rotates; and

the feeder means constructed to feed particles towards the drum, so that at least one particle is in each indentation as it passes the jet.

Re. 29,394

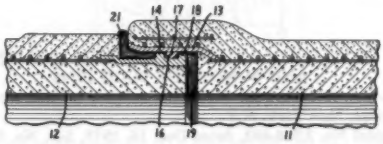
CORROSION PROTECTIVE BAND FOR UNDERGROUND PIPE JOINTS WITH METAL PARTS

Harold V. Swanson, Morris Plains, and Robert E. Bald, Roseland, both of N.J., assignors to Interpace Corporation, Parsippany, N.J.

Original No. 3,904,213, dated Sept. 9, 1975, Ser. No. 526,320, Nov. 22, 1974. Continuation-in-part of Ser. No. 359,967, May 14, 1973, Pat. No. 3,909,010. Application for reissue Feb. 2, 1976, Ser. No. 654,228

Int. Cl.[2] F16J *15/38*

U.S. Cl. 277—229 **3 Claims**



7. A distortable band, suitable for being fit into a joint between first and second continuous successive lengths of pipe made of concrete, wherein a bell formed on one end of the first length is engaged by a spigot formed on the end of a second length, the band made of a cellular water invadable material impregnated with a dry hydratable cement which is reactive with water to hydrate thereby depositing a water impervious hard substance in the joint, a water permeable sheath around the band.

Re. 29,395

METHOD OF FABRICATING A DOUBLE HETEROSTRUCTURE INJECTION LASER UTILIZING A STRIPE-SHAPED REGION

Hiroo Yonezu, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,920,491, dated Nov. 18, 1975, Ser. No. 492,262, July 26, 1974. Continuation of Ser. No. 413,923, Nov. 8, 1973, abandoned, which is a continuation of Ser. No. 267,068, June 28, 1972, abandoned. Application for reissue June 15, 1976, Ser. No. 696,394

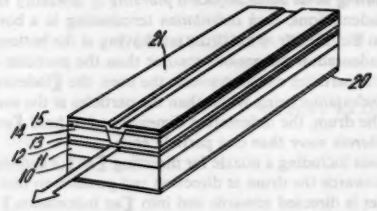
Claims priority, application Japan, July 30, 1971, 46-57665

Int. Cl.[2] H01L *21/205, 21/22, 33/00*

U.S. Cl. 148—175 **3 Claims**

1. A method of producing a $GaAs\text{-}Al_zGa_{1-z}As$ double

hetero-structure injection laser comprising the steps of preparing an n-type GaAs substrate, epitaxially growing a first layer of n-type $Al_xGa_{1-x}As$ on one major surface of said substrate, epitaxially growing a second layer of [P-type] GaAs on said first layer, epitaxially growing a third layer of p-type $Al_x.Ga_{1-x}As$ on said second layer, epitaxially growing a fourth layer of n-type GaAs on said third layer, selectively diffusing p-type impurities into an elongated surface portion of said



fourth layer to form a thin elongated p-type region on the surface of said fourth layer extending depthwise to a portion of said third layer, and forming first and second electrodes in ohmic contact with the whole surface of said fourth layer and with the other major surface of said substrate, respectively, wherein excitation current supplied through said first electrode is allowed to flow substantially only through the deepest portion of said thin elongated p-type region as the result of a reverse bias developed between said third and fourth layers.

Re. 29,396

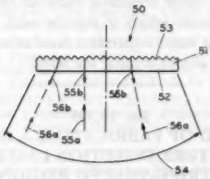
PIN HAVING NONALIGNED CUBE AXIS AND PIN AXIS AND BUNDLE OF SUCH PINS

Sidney A. Heenan, Park Ridge, Ill., assignor to Amerace Corporation, New York, N.Y.

Original No. 3,926,402, dated Dec. 16, 1975, Ser. No. 550,475, Feb. 18, 1975. Division of Ser. No. 354,153, April 24, 1973, Pat. No. 3,923,378. Application for reissue Jan. 16, 1976, Ser. No. 649,594

Int. Cl.[2] C25D *1/00, 1/06;* B29C *1/00;* B29D *11/00*

U.S. Cl. 204—281 **48 Claims**



1. A pin for use in making cube-corner reflectors capable of reflecting light back to the source thereof said pin comprising an elongated shank being of regular polygon outline and having a longitudinally extending pin axis, and a cube-corner formation at one end of said shank and having a cube axis at an angle to said pin axis of other than zero degrees, said cube-corner formation having three mutually perpendicular faces symmetrically arranged with respect to said cube axis and respectively intersecting in three mutually perpendicular edges.

Re. 29,397

SEPARATING APPARATUS

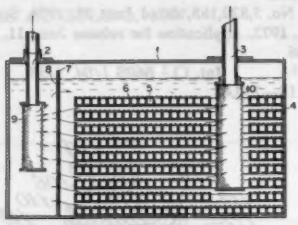
Masahiko Yamazaki, 15-2, 2 chome, Fujizuka, Kohoku, Yokohama, Japan

Original No. 3,812,970, dated May 28, 1974, Ser. No. 303,111, Nov. 2, 1972. Application for reissue May 15, 1975, Ser. No. 577,923

Claims priority, application Japan, Dec. 28, 1971, 46-2991

Int. Cl.[2] B01D *23/00*

U.S. Cl. 210—316 **10 Claims**



1. A settler type separating apparatus *for use with intermittent liquid flow thereto* comprising a vessel for holding liquid having an inlet and outlet spaced from each other towards opposite ends of said vessel; a plurality of longitudinal particle-receiving trays horizontally disposed in the vessel between at least said inlet and outlet and superimposed in parallel and vertically spaced relationship with each other at prescribed vertical intervals, each of said trays having *a plurality of* upwardly opening cavities *defined by walls therebetween, at least a portion of said walls being angularly disposed to the longitudinal direction of the tray;* a fine mesh screen mounted over each tray *and supported by the uppermost portion of said walls* to cover the upper opening of the cavities; [and] partition means disposed between said inlet and one side of said trays, *said partition means being* constructed and arranged so as to cause *intermittently flowing* liquid introduced through said inlet to run over said screens in laminar flow and the screens are constructed and arranged, so that the [flow of the] liquid *when flowing* over the screens forms a *laminar* boundary layer, said screens permitting particles in the liquid to settle from the liquid into the cavities *when the flow of liquid is interrupted,* but the escape of said particles from the cavities being obstructed *during liquid flow* by the boundary layer.

Re. 29,398

SERVOSYSTEM FOR ELECTRICAL MACHINING PROCESSES

Kiyoshi Inoue, 3-chome 16-8, Kamiyoga, Setagaya Tokyo, Japan

Original No. 3,781,507, dated Dec. 25, 1973, Ser. No. 272,463, July 17, 1972. Division of Ser. No. 19,364, March 13, 1970, Pat. No. 3,686,461. Application for reissue Nov. 17, 1976, Ser. No. 742,458

Claims priority, application Japan, Mar. 17, 1969, 44-20518; Apr. 8, 1969, 44-27070; Mar. 13, 1969, 44-18991; Apr. 2, 1969, 44-25317; Apr. 2, 1969, 44-25318; Apr. 30, 1969, 44-33960; May 30, 1969, 44-42188; Nov. 1, 1969, 44-87832; Nov. 26, 1969, 44-94741; Nov. 26, 1969, 44-94742

Int. Cl.[2] B23P *1/08, 1/14*

U.S. Cl. 219—69 G **9 Claims**

1. A servocontrol system for relatively positioning a pair of electrodes spacedly juxtaposed across a current-traversing gap, comprising:

gap-monitoring means connected across said electrodes for producing an electrical signal representing the gap width;

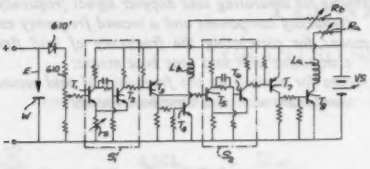
a first SCHMITT trigger circuit connected to said gap-monitoring means and having an output element;

motive means including coil means energizable to displace said movable electrode in opposite directions;

a first electronic switch connected in circuit with an electri-

cal power source and said coil means and connected to said element and responding to said first SCHMITT trigger for operating said motive means in one direction;

a second SCHMITT trigger connected to said element of said first SCHMITT trigger; and



a second electronic switch connected to said second SCHMITT trigger and in circuit with said source and said coil means for operating said motive means in the opposite direction upon detection by said second SCHMITT trigger of a condition at said first SCHMITT trigger rendering said first electronic switch ineffective.

Re. 29,399

SERVOSYSTEM FOR GAP ELECTRICAL MACHINING PROCESSES (ESPECIALLY ELECTROEROSION)

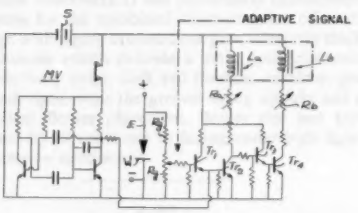
Kiyoshi Inoue, 3-chome 16-8, Kamiyoga, Setagaya, Tokyo, Japan

Original No. 3,686,461, dated Aug. 22, 1972, Ser. No. 19,364, Mar. 13, 1970. Application for reissue Nov. 17, 1976, Ser. No. 742,447

Claims priority, application Japan, Mar. 13, 1969, 44-18991; Apr. 2, 1969, 44-25317; Apr. 2, 1969, 44-25318; Apr. 30, 1969, 44-33960; May 30, 1969, 44-42188; Nov. 1, 1969, 44-87832; Nov. 26, 1969, 44-94741; Nov. 26, 1969, 44-94742; Mar. 17, 1969, 44-20518; Apr. 8, 1969, 44-27070

Int. Cl.[2] B23P *1/08, 1/14*

U.S. Cl. 219—69 G **3 Claims**



1. In the electric-discharge machining of a conductive workpiece wherein a machining electrode and the workpiece electrode, at least one of which is movable, are spacedly juxtaposed to form a dielectric-filled machining gap therebetween and an electro-erosive discharge is intermittently effected across the gap while the gap spacing of the latter is maintained substantially constant as material is removed from the workpiece, a method of controlling said machining gap comprising the steps of:

a. deriving an analog signal as a function of a gap variable representative of the gap spacing;

b. providing at least one threshold level corresponding generally to a preselected gap spacing, and establishing a first digital state upon said analog signal exceeding said threshold level and a second digital state upon said analog dropping below said threshold level;

c. deriving a first steep wavefront pulse signal of one polarity and a second steep wavefront pulse signal of the reverse polarity upon the establishment of said first and second digital states, respectively; and

d. shifting said movable electrode in response to said pulse signals in a direction determined by the presence and polarity of one of said pulse signals,

said first and second digital states being disestablished upon said analog signal dropping below said threshold level and upon said analog signal exceeding said threshold level respectively,

said first and second pulse signals each being maintained during the presence of said first and second digital states, respectively, and

said first digital signal being a signal driving said movable electrode upwardly; and intermittently canceling said first digital signal while the electrode is in upward movement.

Re. 29,400

DIRECT CURRENT POWER SUPPLY FOR MANUAL ARC WELDING

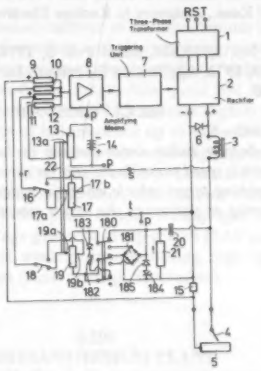
Rolf Ericsson, Laxa, Sweden, assignor to Elektriska Svetsningsaktiebolaget, Goteborg, Sweden

Original No. 3,928,746, dated Dec. 23, 1975, Ser. No. 352,445, Apr. 18, 1973. Application for reissue May 17, 1976, Ser. No. 687,223

Claims priority, application Sweden, Apr. 18, 1972, 4964/72

Int. Cl.[2] B23K *9/10*

U.S. Cl. 219—135 **10 Claims**



1. A direct current power supply for manual arc welding having a steeply drooping, adjustable volt-ampere characteristic comprising

a polyphase transformer having a plurality of secondary output leads carrying mutually phase displaced voltages, a polyphase rectifier system connecting said secondary output leads to a pair of D.C. welding current conductors for supplying a direct current to a welding arc struck between a welding electrode and a workpiece, said polyphase rectifier system comprising a set of triggered rectifier valves connected one in series with each of said secondary output leads, said triggered rectifier valves having each a trigger terminal for initiating current flow through the valve,

means for periodically supplying igniting pulses to each of said trigger terminals, including means for causing the angular position of said pulses to vary in response to a direct current control signal,

means for generating said direction current control signal comprising the following means,

a. means for producing an adjustable direct current reference signal, including manually operable means for adjusting said reference signal,

b. means including a welding current sensing means for producing a welding current feed-back D.C. signal equal to the welding current flowing in the pair of

welding current conductors multiplied by a first factor of proportionality,

c. means including a welding voltage sensing means for producing a welding voltage feed-back D.C. signal equal to the voltage between the welding current conductors multiplied by a second factor of proportionality,

d. summing means for combining said reference signal, said welding current feed-back signal and said welding voltage feed-back signal into a compound signal constituting said control signal, both of said feed-back signals being supplied to said summing means in opposing relationship to said reference signal,

e. slope adjustment means comprising means for adjusting the proportion between said first and second factors of proportionality, and,

f. means linking said manually operable means for adjusting the reference signal and said proportion adjusting means to provide automatically a desired correlation between the slope of volt-ampere characteristic of the power supply and the reference signal setting.

Re. 29,401

METHOD AND APPARATUS FOR DIGITALLY MEASURING SPEED

John L. Aker, Chanute, Kans.; Donald L. Geist, Garland, Tex.; Freddie R. Kittle, St. John, and Fred M. Berry, Leawood, both of Kans., assignors to Kustom Electronics, Inc., Chanute, Kans.

Original No. 3,936,824, dated Feb. 3, 1976, Ser. No. 361,822, May 18, 1973. Application for reissue July 22, 1976, Ser. No. 707,535

Int. Cl.[2] G01S 9/46

U.S. Cl. 343—8 **24 Claims**

23. A doppler radar device for use in law enforcement and service vehicle speed surveillance and for determining the speed of an approaching target vehicle when the radar platform vehicle is either moving or stationary, the device comprising:

a time base means;

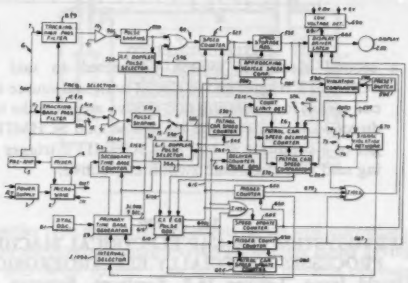
a single means for receiving a composite doppler signal having components relating to the speed of said target vehicle and the speed of the radar platform vehicle;

automatic gain control means for precluding said device from exceeding its dynamic range under preselected conditions;

means for separating said doppler signal frequency into a first frequency component and a second frequency component;

means for correlating the frequency of said first frequency component with said time base means;

means for correlating the frequency of said second frequency component with said time base means;



means for counting cycles of each of said time base correlated frequency components, said frequency components counting means operable to count each of said frequency components within preselected time increments, said time increments relating to said time base means;

means for subtracting said counter cycles of said first frequency component from said counted cycles of said second frequency components; and

means for displaying the result from said subtracting means in units indicative of speed of said approaching vehicle.

PLANT PATENTS

GRANTED SEPTEMBER 13, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,101
KALANCHOE PLANT

Adolf Grob, Saint Gall, Switzerland, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed July 27, 1976, Ser. No. 709,221
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Kalanchoe plant characterized particularly as to uniqueness by the combined characteristics of fast and compact growth; develops a large floral display with a minimum amount of basal growth required before removal of the apical tip; a relatively large flower having a bright red color; continuous flowering over a period of up to two months; suitable for production as small plants for pots, and by its production of vegetative cuttings that propagate very readily.

4,102
KALANCHOE PLANT

Adolf Grob, Saint Gall, Switzerland, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed July 28, 1976, Ser. No. 709,281
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Kalanchoe known by the cultivar name Feuerwerk II and particularly characterized as to uniqueness by the combined characteristics of relatively large foliage with highly crenated margins; relatively thick and strong peduncles which provide a more open placement of flowers; relatively large, dark red flowers; excellent growth qualities and vigor, with the growth being upright and compact; excellent flower placement, flower size and keeping qualities, and by its resistance to fading under high light and high temperature conditions.

4,103
KALANCHOE PLANT

Adolf Grob, Saint Gall, Switzerland, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed July 27, 1976, Ser. No. 709,282
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Kalanchoe plant known by the cultivar name Sirius and particularly characterized as to novelty by its vigorous growth; intense orange flower color; early flowering; excellent self branching; exceptionally large total flower size; excellent cutting production; well formed umbels that continue to develop over several weeks growth, and by its apparently great resistance to botrytis stem rot.

4,104
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, both of Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed July 9, 1976, Ser. No. 703,901
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Scintalizer and characterized particularly as to uniqueness by the combined characteristics of daisy inflorescence type with moderate longitudinal petal roll in opening stages, flat inflorescence from which reflexes slightly with age, diameter across face of inflorescence up to 4.0 inches at maturity, golden yellow ray floret color with slight bronzy overtones, medium green disc floret color at immature, unopened stage, minimal pollen development, uniform nine week flowering response, very tall plant height, semiupright branching habit, high percentage gradeout in top grades (SAF standards), and by its thin and weak peduncles during high light, high temperature periods (June through September).

4,105
CHRYSANTHEMUM PLANT

Sigvart Jorgensen, Shelby, N.C., assignor to Patterson's Flowers, Inc., Shelby, N.C.

Filed July 23, 1976, Ser. No. 708,288
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—76 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat. known by the cultivar name Snow Purple and particularly characterized as to uniqueness by the combined characteristics of decorative inflorescence type; flat inflorescence form; purple inflorescence color with uniform color oxidation; diameter across face of inflorescence up to 9 cm. at maturity; uniform eight week flowering response to photoperiodic short-day control; short plant height; and semi-spreading branching pattern.

PATENTS

GRANTED SEPTEMBER 13, 1977

ERRATA

For CLASS	See PATENT NO.
051-106 R	4,047,338
051-313	4,047,343
215-224	4,047,495
206-620	4,047,660
180-141	4,047,728
428-539.5	4,047,897
096-115 R	4,047,963
096-126	4,047,964
108-155	4,048,059
260-002 AJ	4,048,100
260-002.5 E	4,048,101
260-002.5 AM	4,048,102
260-2.5 B	4,048,103
260-2.5 AN	4,048,104
260-2.5 AC	4,048,105
260.2.5 AV	4,048,106
260.002.5 AC	4,048,107
542-422	4,048,155
544-021	4,048,160
555-027	4,048,161
544-022	4,048,162
544-021	4,048,163
544-121	4,048,164
544-166	4,048,165
544-215	4,048,166
544-215	4,048,167
264-045.3	4,048,208
560-128	4,048,214
560-124	4,048,215
560-020	4,048,217
560-147	4,048,218
560-156	4,048,219
560-237	4,048,220
361-321	4,048,546
363-025	4,048,552
363-057	4,048,553
363-098	4,048,554
364-900	4,048,622
364-200	4,048,624
364-900	4,048,625
357-017	4,048,627

PATENTS

GRANTED SEPTEMBER 13, 1977

ERRATA

PATENTS

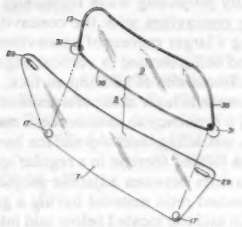
GRANTED SEPTEMBER 13, 1977

GENERAL AND MECHANICAL

4,047,249
PROTECTIVE HELMET AND FACE SHIELD ASSEMBLY THEREFOR

Robert G. Booth, 6661 Banning Drive, Oakland, Calif. 94611

Filed Dec. 29, 1975, Ser. No. 644,848
Int. Cl.[2] A42B *3/00*; A61F *9/02*
U.S. Cl. 2—10 **3 Claims**



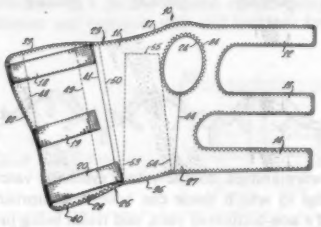
1. A helmet assembly comprising a helmet having an opening for the eyes, a face shield assembly for said helmet, said face shield assembly including a face shield adapted to cover an area substantially greater than said eye opening, means removably affixing said face shield to said helmet as a covering over said opening, and glare reducing means affixed to said face shield for reducing glare and removable with said face shield as a unit, said glare reducing means being protected by said face shield and covering said eye opening and having a rim on the periphery thereof and projecting outwardly from the plane of said glare reducing means to contact the surface of said helmet to maintain said glare reducing means spaced apart from said helmet to substantially prevent surface contact between said glare reducing means and said helmet, whereby marring of the surface of said glare reducing means is avoided, said glare reducing means and said face shield being spaced apart from each other by said rim to provide an air gap therebetween and spaced openings in said rim to provide air circulation between said face shield and said glare reducing means.

4,047,250
CONTOURED WRIST SUPPORT

Bill Norman, 14431 Galy, Tustin, Calif. 92680

Filed Oct. 12, 1976, Ser. No. 731,511
Int. Cl.[2] A11D *19/00*
U.S. Cl. 2—161 A **31 Claims**

1. A wrist support comprising
flexible sheet means adapted to extend around portions of the hand and wrist of the user thereof,
fastener means for holding said sheet means so extended around the hand and wrist, and reinforcement means for said sheet means, said reinforcement means including
a first reinforcing member carried by a first portion of said sheet means for overlying portions of the palm of the hand and inner surface of the wrist, said first reinforcing member having a compound curvature such that it is substantially complementary to said portions of the palm of the hand and inner surface of the wrist,
a second reinforcing member carried by a second portion of said sheet means for overlying portions of the back of the hand and wrist,
said second reinforcing member being substantially straight longitudinally and curved transversely such that it is substantially complementary to said portions of the back of the hand and wrist,

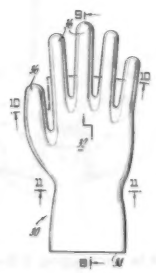


and a third reinforcing member carried by a third portion of said sheet means intermediate said first and second reinforcing members for overlying portions of the side edge of the hand and wrist.

4,047,251
GLOVE AND FORM AND METHOD FOR MAKING SAME

Glenn Francis Stockum, Arlington, Tex., assignor to Arbrook, Inc., Arlington, Tex.

Filed Sept. 20, 1976, Ser. No. 724,491
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—168 **4 Claims**



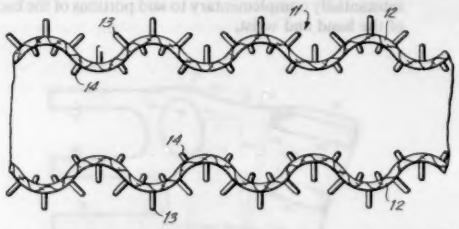
1. A medical glove adapted to tightly conform to the skin of a wearer's hand over the entire inner surface of said glove, comprising: a hand portion; an open end cuff portion; and a plurality of elongated finger-receiving compartments, each of said compartments having a top convexly curved section, a bottom convexly curved section and two opposed convexly curved side sections, said side sections being more sharply curved than said top and bottom sections and protruding outwardly to form air-venting channels when a finger of a wearer is partially inserted into said compartment.

4,047,252

DOUBLE-VELOUR SYNTHETIC VASCULAR GRAFT

William J. Liebig, Franklin Lakes, and German Rodriguez-M, Bergenfield, both of N.J., assignors to Meadox Medicals, Inc., Oakland, N.J.

Filed Jan. 29, 1976, Ser. No. 653,680
Int. Cl.[2] A61F 1/24
U.S. Cl. 3—1.4 30 Claims



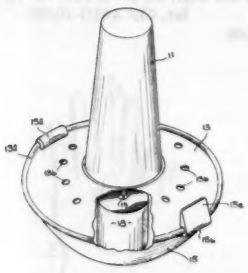
1. A warp-knitted, double-velour synthetic vascular graft of a material to which tissue can adhere, comprising a tubular trellis of a non-texturized yarn, said trellis being provided with a multiplicity of knitted fibrous loops of a texturized yarn projecting both outwardly and inwardly from the surfaces of said trellis and presenting a pile mat of filamentary material receptive to tissue ingrowth on the outer and inner surfaces of said trellis, the ratio of the length of said loop yarn to the length of said trellis yarn in said graft lying between 1.75 and 4.50 , said loops being effective to improve the rate of growth of tissue into said graft.

4,047,253

DEVICE AND METHOD FOR UNCLOGGING DRAINS

Tor H. Petterson, 31248 Palos Verdes Drive West, Palos Verdes Peninsula, Calif. 90274

Filed Nov. 28, 1975, Ser. No. 636,110
Int. Cl.[2] E03D 11/00
U.S. Cl. 4—255 14 Claims



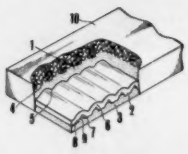
1. A device for use in unclogging a drain comprising:
means for forming a seal around the drain opening,
cartridge means having at least two materials retained thereby capable of effecting a reaction with each other to cause the immediate emission of gas at a substantial pressure,
means for retaining said cartridge means in fluid communication with said drain and within said seal, and
means for mixing said materials in said cartridge means with each other to effect said reaction whereby gas is immediately released into the drain at a substantial pressure to free the clogging substance therefrom.

4,047,254

MATTRESS CONSTRUCTION

Mituyoshi Hamasu, 31-13, 1-chome, Higashi Ikebukuro, Toshima, Tokyo, Japan

Filed Apr. 8, 1976, Ser. No. 674,910
Claims priority, application Japan, Dec. 13, 1975, 50-149000
Int. Cl.[2] A47C 27/08
U.S. Cl. 5—345 R 4 Claims



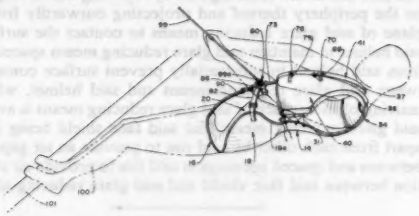
1. A mattress construction comprising an intermediate layer of a semi-rigid resin material having top and bottom surfaces with continuous outwardly projecting wave formations adjacent inwardly projecting concavities with the concavities of the bottom surface having a larger radiuus of concavities than that of the top surface and being formed in vertical alignment below the wave-shaped formations of said top surface, a top layer overlying said intermediate layer made of a resilient foam resin material and having a resiliency so as to become restored to its original shape after unloading, said top surface having a multiplicity of projections formed thereon in a regular spaced-apart pattern with concavities between adjacent projections, and a lower layer of a foamed resin material having a greater elastic restoring force than said top located below said intermediate layer.

4,047,255

FLOTATION HIKING HARNESS

James E. Kiefer, 2510 Lone Jack Road, Olivenhain, Calif. 92024

Filed May 4, 1976, Ser. No. 682,891
Int. Cl.[2] B63C 9/08
U.S. Cl. 9—337 11 Claims



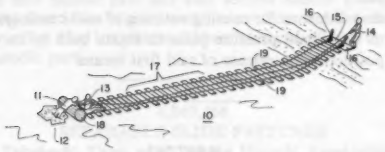
1. A flotation hiking harness comprising:
buckle means located approximately over the mid abdomen of the wearer;
a continuous back panel section covering the back of the wearer and having a bottom portion covering the buttock, said back section extending at one end up to the shoulders of the wearer;
a crotch section connected to the other end of the back section and extending between the legs of the wearer;
a pair of side sections each connected to one side of said back section and extending over the hips of the wearer and terminating short of said buckle means;
a shoulder section connected with said one end of said back section and extending across the shoulders of the wearer;
a pair of continuous front panel sections each connected at its upper end to said shoulder section and extending side by side down over the chest of the wearer and terminating above said buckle means; and

connecting means for connecting said buckle means to said crotch section, said side sections and said front sections.

4,047,256
BRIDGE CONSTRUCTION METHOD
Bernard Hasara, P.O. Drawer 2047, Conroe, Tex. 77301
Filed Nov. 11, 1976, Ser. No. 740,807
Int. Cl.[2] E01D *1/00*
U.S. Cl. 14—1 **17 Claims**

1. A bridge construction method comprising: removing the trucks and wheels from a flatbed type railroad car to provide a bridge substructure, preparing support means upstanding from an area to be bridged for emplacement of said substructure, and emplacing said substructure on said support means over said area.

4,047,257
LIFE SAVING APPARATUS
Walter W. Bondarchuk, Sr., Greenport, N.Y., assignor to Lawrence Peska Assoc., Inc., New York, N.Y.
Filed May 21, 1976, Ser. No. 688,604
Int. Cl.[2] E01D *15/14*
U.S. Cl. 14—27 **4 Claims**



1. A life saving device comprising a flexible elongated mat, which mat includes a plurality of rigid slats extending crosswise of the mat, each slat being affixed to the adjacent slats by means of at least one flexible member, which mat is terminated at its first end by a flotational member and at its second end by an anchoring member, the flotational member including a cylinder of rigid foamed polymer affixed to the mat in an orientation parallel to the slats.

4,047,258
LIP LOCK WITH RELEASE AND COUNTERBALANCE FOR DOCK BOARD
Peter B. Burnham, Columbus, Ohio, assignor to Harsco Corporation, Camp Hill, Pa.
Filed Dec. 3, 1976, Ser. No. 747,078
Int. Cl.[2] E01D *1/00, 15/06*
U.S. Cl. 14—71.3 **12 Claims**

1. A lip lock mechanism for releasable maintaining a lip pivoted to a leading edge of a loading ramp in a projected position comprising

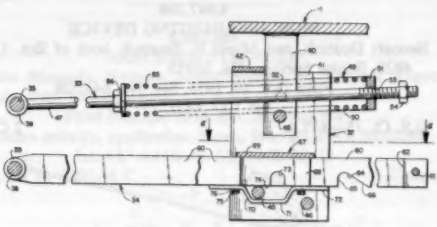
a lock support suspended from the loading ramp for pivoted movement about a horizontal axis extending parallel to the leading edge of the ramp, said support displaced a distance rearwardly from the leading edge of the ramp with the horizontal axis being in downwardly spaced relationship to the ramp,

an elongated connector bar mechanically coupled with said lock support in vertically spaced relationship to the horizontal axis and extending forwardly with a leading end pivotally connected with the lip,

resilient biasing means interconnecting said bar with said lock support for normaly urging said bar in forwardly extending relationship but permitting relative rearward movement,

an elongated lock bar coupled with said lock support in vertically spaced relationship to the horizontal axis at a side opposite that to which said connector bar is coupled, said lock bar extending forwardly with a leading end thereof pivotally connected with the lip,

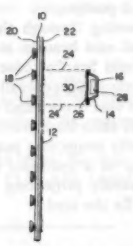
coupling means releasably connecting said lock bar with said lock support, said coupling means including a lock pin carried by said lock support in horizontally disposed relationship, and a lock plate connected in retained relationship with said lock pin for limited reciprocating movement thereto and engaged with said lock bar for sliding



movement longitudinally relative thereto, said lock plate having a notch formed therein for receiving said lock pin, said lock bar having a notch formed therein for receiving said lock pin, said lock bar notch having a surface formed at a forward side which, when said lock pin is received therein, prevents rearward movement of said lock bar and a surface formed at a rearward side which will cam the lock bar out of engagement with said lock pin as the lock bar is moved forwardly, and,

a lock release member carried by said lock support for engaging said lock bar upon pivoting of said lock support to move the lock bar out of locking engagement with said lock pin.

4,047,259
BODY WASHING APPARATUS
Leonard L. Lotis, 9115 Ridge Blvd., Brooklyn, N.Y. 11209
Filed May 20, 1976, Ser. No. 688,119
Int. Cl.[2] A47K *7/03*
U.S. Cl. 15—104.92 **4 Claims**



1. A body washing apparatus comprising a flexible mat, first fastening means to removably secure a first lateral surface of said flexible mat to a mounting surface, a porous flexible soap container, second fastening means to removably secure said soap container to said mat, soap introducing means for selectively opening and closing said flexible soap container for the selective introduction and removal of a bar of soap therein, wherein said first fastening means includes a plurality of suction cups, said plurality of said suction cups fixedly secured to said first lateral surface, the open mouth portion of each of said

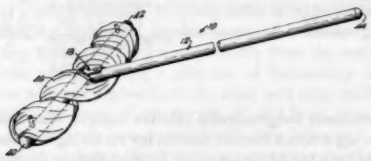
plurality of suction cups residing in a plane, said plane being disposed outwardly from and parallel with said first lateral surface, wherein said second fastening means comprises a fabric material, said fabric material being disposed outwardly on a second lateral surface of said mat, said second lateral surface being disposed on a side opposite to said first lateral surface of said mat, a gripping means on a surface of said soap container, said gripping means being fabricated from a plastic material, said second fastening means utilizing said plastic material having a plurality of fingers extending outwardly from said soap container, the free ends of said fingers being disposed in diverse directions, said free ends for releasably grasping said fabric material.

4,047,260

MOP AND DUSTING DEVICE

Bennett Deutsch, and Maria E. Deutsch, both of Rte. 1, Box 4820, Bonita Springs, Fla. 33923

Filed Dec. 29, 1975, Ser. No. 644,728
Int. Cl.² A47L *13/24*
U.S. Cl. 15—147 A **2 Claims**



1. A combination mop and dusting fabric holder comprising an elongated tubular handle member, and an elongated, substantially cylindrical tubular cross head member fixed at right angles relative to said handle member by a generally U-shaped bracket means defining a generally T-shaped assembly, said U-shaped bracket means comprising a pair of leg portions fixed to opposite sides of a first end portion of said tubular handle and a base portion fixed to the mid-portion of said cross head, said bracket leg portions being curved transversely, inwardly to conform with and engage against the contour of the outer circumference of said handle first end portion,

said bracket base portion being curved to conform with and engage against the contour of the outer circumference of said cross head, said handle first end portion terminating in an arcuate configuration bearing against and conforming with the contour of the outside diameter of said cross head,

a single rivet rigidly fixing said bracket leg portions and said handle first end portion,

a single rivet passing through the central portion of said cross head and said bracket at the juncture of said leg portions and said bracket base for rigidly coupling the same, a stud extending generally upwardly through each end portion of said cross head adjacent opposite ends of the cross head, each stud providing a headed lower end and an upwardly projecting portion, and

an elongated cap of a synthetic material press fitted over each said upwardly projecting portion and engaging the cross head to fix the stud.

4,047,261

MOP WRINGER

James M. Rones, P.O. Box 47200, Atlanta, Ga. 30340

Filed Aug. 24, 1976, Ser. No. 717,420
Int. Cl.² A47L *13/14, 13/58*
U.S. Cl. 15—261 **6 Claims**

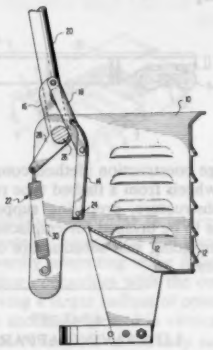
1. A downward pressure mop wringer comprising:

a. an open-topped hopper sized to receive a mop-head to be wrung and having apertures therein to permit exit of wrung out water;

b. a pressure plate mounted in said hopper for limited rotation about a first horizontal axis located towards the bottom of, and within, said hopper, said pressure plate being approximately vertically disposed in the normal state of the mop wringer;

c. a first crank-arm mounted for limited rotation about a second horizontal axis located towards the top of said hopper;

d. a link arm pivotably connecting said crank-arm to said pressure plate;



e. first means for causing rotation of said crank-arm so as to cause said pressure plate to rotate from its normal approximately vertical position to a position wherein it will exert downward pressure on a mop-head located in said hopper; and

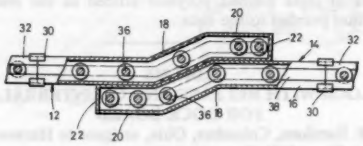
f. second means for causing rotation of said crank-arm so as to cause said pressure plate to rotate back to its normal position upon release of said first means.

4,047,262

DEVICE FOR INTERCONNECTING CURTAIN RODS

Takeshi Izawa, 1101, Shinmachi, Ikunocho, Asako, Hyogo, Japan

Filed Dec. 30, 1975, Ser. No. 645,352
Int. Cl.² A47H *1/04*
U.S. Cl. 16—96 D **4 Claims**



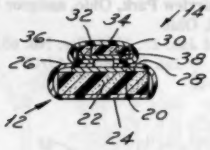
1. A device to be interposed between the opposed ends of two straight curtain rods aligned end-to-end for interconnecting the curtain rods, the device comprising two connecting rails joined together side by side in a horizontal plane and each having a track for guiding the movement of curtain carriers, each of the connecting rails including a straight portion having an open outer end to be connected to the corresponding straight curtain rod, a bent portion continuous with the straight portion and bent side-wise for a distance sufficient to deviate the the axis of said bent portion by the width of the rail in the horizontal plane; and an extension continuously extending from said bent portion with its axis in parallel to the axis of the straight portion and spaced apart therefrom by the width of the rail, the staight portion of each of the connecting rails being in axial alignment with the straight portion of the other connecting rail.

4,047,263

SOFT-FEEL HANDLE AND METHOD OF MAKING SAME

Kenneth V. Tietze, Algonac, Mich., assignor to Textile Trim, Inc., Fair Haven, Conn.

Filed Nov. 12, 1976, Ser. No. 741,303
Int. Cl.[2] B65D *25/28*
U.S. Cl. 16—125 4 Claims



1. An improved elongated soft-feel handle comprising:

a first handle part including an elongated metallic core having first and second sides, a first elongated cushioning member positioned on the first side of said core, and a first elongated thermoplastic sheath surrounding said core and said first cushioning member, and first sheath having first and second longitudinal edgespositioned on the second side of the metallic core;

a second handle part including a second elongated cushioning member and a second elongated thermoplastic sheath surrounding said second cushioning member, said second elongated sheath having first and second longitudinal edges positioned on one side of said second cushioning member; and

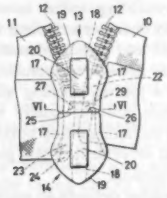
said first handle part and said second handle part joined together in an aligned relation so that each handle part overlies the longitudinal sheath edges of the opposite handle part.

4,047,264

SEPARABLE SLIDE FASTENER

Kihei Takahashi, Uozu, and Yositaka Higuchi, Kami-ichimachi, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 461,735, April 17, 1974, Pat. No. 3,900,926.
This application May 29, 1975, Ser. No. 581,811
Claims priority, application Japan, Apr. 20, 1973, 48-48146[U]
Int. Cl.[2] A44B *19/36*
U.S. Cl. 24—205.11 R 1 Claim



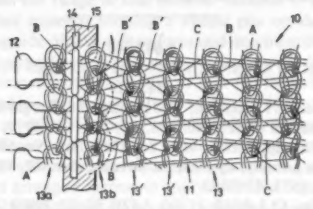
1. In a separable slide fastener of the class including a pair of stringers having longitudinal rows of interlocking fastener elements on their opposed edges respectively, a slider arranged on said rows of fastener elements for longitudinal movement therealong to engage and disengage the same, said slider having a pair of spaced-apart and interconnected wings disposed to define a generally Y-shaped guide channel therethrough, a box member arranged on one end of one of said stringers for limiting the movement of said slider, said box member having a pair of spaced-apart and interconnected plate portions having a guide channel therein, and a pin member arranged on the corresponding end of the other stringer for insertion through the guide channels of said slider and said box member, the improvement comprising means defining a pair of recesses and a pair of tongues having a configuration complementary to corrsponding recesses and disposed for insertion thereinto, each recess and corresponding tongue being disposed on respective confronting ends of said box member and slider, said tongues and recesses being generally trapezoidal to aid the in the alignment of said slider and box member when the tongues are received in the recesses, thereby aiding the insertion and removal through said guide channels of said pin member, said tongues and recesses each being positioned in generally central symmetrical relation to a corresponding one of said confronting ends of the box member and slider, each tongue being disposed for fully concealed insertion into a corresponding recess.

4,047,265

FASTENER STRINGER

Yoshio Matsuda, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 23, 1976, Ser. No. 660,374
Claims priority, application Japan, Feb. 28, 1975, 50-25365
Int. Cl.[2] A44B *19/10*; D04B *23/12*
U.S. Cl. 24—205.16 C 5 Claims



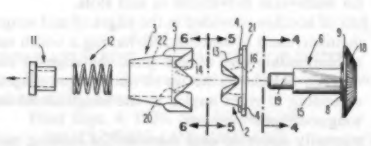
1. A fastener stringer which comprises a warp-knit tape and a row of interlocking fastener elements secured thereto by a line of stitching, said tape having a web portion of a relatively coarse interstice structure, a longitudinal edge portion consisting solely of knit-loop forming threads and bearing said row of fastener elements, and a connecting portion of a relatively fine interstice structure interconnecting said web portion and said edge portion transversely of the tape, said connecting portion being formed by threads constituting said web portion and said edge portion, respectively, the knit-loop forming threads of said longitudinal edge portion including chain stitches defining plural parallel longitudinal wales, a first tricot stitch spanning a plurality of wales, and a second tricot stitch spanning a greater plurality of wales than spanned by said first tricot stitch.

4,047,266

QUICK ACTION FASTENER

Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed Mar. 15, 1976, Ser. No. 666,766
Int. Cl.[2] A44B *17/00*
U.S. Cl. 24—221 R 3 Claims



1. A quarter turn unitary snap fastener adapted for securing overlying outer and inner panels having coaxial and essentially orthogonal non-circular holes formed therein, comprising a rotatable stud having a head and a shank, said shank having a non-circular cross section over at least a portion of the length

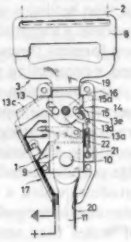
of said stud, an outer cam element having an axial bore positioned over said shank with said shank free to rotate within said bore, said outer cam element comprising a flange adapted to engage the outer surface of the outer panel, inwardly extending cam surfaces integral with said flange adapted to be inserted through the holes formed in the outer and inner panels, a raised surface integral with the inner surface of said flange and adapted for engagement with the non-circular hole in the outer panel on insertion of the cam elements through said hole, thereby preventing rotation of said outer cam element relative to said panel, an inner cam element having an axial bore at least a portion of which is non-circular in cross section and which engages the non-circular portion of said shank and is adapted to rotate therewith while being free to move axially relative thereto and having outwardly extending cam surfaces adapted to engage the cam surfaces of said outer cam element thereby forming an enclosure for said stud, at least two projections integral with said inner cam element and extending radially a distance greater than the smaller diameter of the non-circular holes in said panels and less than the larger diameter of said holes, biasing means positioned to engage said inner cam element and urging said inner cam element toward the outer cam element, whereby said inner cam element is rotated and moved axially inward on rotation of said stud while said outer cam element is held in fixed position relative to said outer panel.

4,047,267

DEVICE IN CONNECTION WITH LOCKS FOR SAFETY BELTS

Oskar Lennart Lindblad, Hedasgatan, 16, Vargarda, Sweden

Continuation of Ser. No. 533,795, Dec. 18, 1974, abandoned.
This application May 21, 1976, Ser. No. 688,767
Claims priority, application Sweden, Dec. 27, 1973, 7317454; Dec. 27, 1973, 7317453
Int. Cl.[2] A44B *19/00*; A62B *35/02*; B60R *21/10*
U.S. Cl. 24—230 AL **1 Claim**



1. A connector comprising a male tongue-shaped member, a female member having a pair of flat sidewalls, and means for releasably locking said male and female members to each other, said means comprising

a pair of opposed transverse slots in each of said side walls, said slots in one side wall registering with said slots in the other side wall,

a pair of pins each of which is guided by one of said slots in one side wall and the registering slot in the other side wall for transverse movement in said slots,

a pair of notches provided in the edges of said tongue-shaped member, each of said notches having a width sufficient to accommodate one of said pins, the edge of each of the notches nearest to the tip of said tongue-shaped member extending at right angles to the longitudinal axis of said tongue-shaped member,

a manually operable cam member for shifting said pins between an inner position in which said pins engage said notches and an outer position outside said notches, said cam member having a pair of opposed flat shanks each of which has a pair of camming slots engaging end portions of said pair of pins,

spring means urging said cam member towards a position in which said pins occupy their inner positions, and

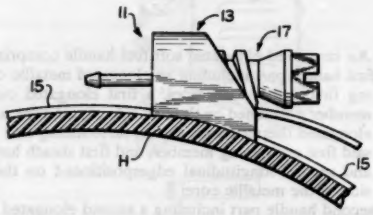
said cam member being a lever pivotable about an axis extending at right angles to said parallel side walls between the inner ends of said opposed slots therein.

4,047,268

WORM GEAR CLAMPING APPARATUS

A. T. Buttriss, Fairview Park, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 21, 1976, Ser. No. 651,082
Int. Cl.[2] B65D *63/00*
U.S. Cl. 24—274 R **9 Claims**



1. A flexible, encircling, clamping apparatus comrpising:

a. a worm gear drive head;

b. a flexible strap member having a first end adapted to be attached to said worm gear drive head and a second end, said strap member having an inward side and an outward side, said outward side having a portion adjacent said second end defining partial internal threads;

c. worm member having external threads, threadably engageable with said internal threads, over a portion of its length, a flexible elongated guide portion projecting forwardly thereof; and means disposed at the rearward end thereof for rotating said worm member;

d. said worm gear drive head defining a strap-receiving opening extending axially therethrough for receiving said second end of said strap member;

e. said worm gear drive head defining a worm chamber adapted to receive said external threaded portion of said worm member rotatably disposed therein said worm chamber having a clearance with said worm when said worm is engaged with said partial internal threads of said second end within said chamber allowing rotation of said worm but preventing radial movement of said worm relative to said chamber sufficient to cause said worm to disengage from said partial internal threads;

f. said worm gear drive head including a forward wall portion defining a journal opening adapted to receive said elongated guide portion axially movable therein, said guide portion including a stop portion for limiting normal rearward axial movement of said guide portion relative to said journal opening;

g. said worm member defining an assembled position relative to said worm gear drive head with said external threads disposed within said worm chamber and in meshing engagement with said partial internal threads; and

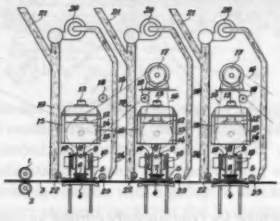
h. said worm member defining a pre-assembled position relative to said worm gear drive head with said stop portion disposed adjacent said forward wall, said guide portion disposed within said worm chamber and said external threads disposed rearwardly of said worm gear drive head to permit said worm member to be pivoted away from said strap member, disengaging said external threads from said partial internal threads and permitting free axial movement of said strap member relative to said worm gear drive head.

4,047,269

METHOD AND APPARATUS FOR PRODUCING ORNAMENTALLY PATTERNED, NEEDLED, NONWOVEN PILE FABRICS

Herbert Lochner, Kempen, Germany, assignor to cikalon-Vliesstoff-werke GmbH, Kempen, Germany

Continuation-in-part of Ser. No. 455,897, March 28, 1974, abandoned. This application June 24, 1976, Ser. No. 699,599
Claims priority, application Germany, Apr. 7, 1973, 2317637
Int. Cl.[2] D04H *18/00, 11/00*
U.S. Cl. 28—109 10 Claims



1. A method for producing needle nonwoven pile fabric having a back side and a front side and consisting of a reinforced fabric web of backing material having needled thereinto loose staple fibers forming a visible pile layer on the front side of said fabric, said pile layer being composed of loose fibers of different types, said method comprising the steps of providing a needling machine for needling loose staple fibers into a backing web in an overall predetermined ornamental pattern, said needling machine including a plurality of needling stations each including needle means, said needle means of each one of said plurality of needling stations being arranged to needle loose fibers into said backing web in a pattern which consitutes one part only of said overall predetermined ornamental pattern, each of said plurality of needling stations being adapted to needle into said backing web one type of said different types of loose fibers, introducing said reinforced backing web into said needling machine with one side thereof facing upwardly and with the opposite side facing downwardly, intermittently passing the backing web through said needling stations in a given feed direction, delivering one type of said different types of loose staple fiber material upon said upwardly facing side of said web at a point upstream from each one of said plurality of needling stations, distributing said fiber material upon said web by operation of roller means extending across said web at a point upstream of each one of said plurality of needling stations to impart a predetermined thickness of fiber material upon said web, intermittently stopping said web with selected sections thereof located to be engaged by said needle means of each of said plurality of needling stations, operating said needle means of each of said plurality of needling stations to attach said fibers to said web at each of said plurality of needling stations in a pattern which forms a part of said overall predetermined ornamental pattern within the range of said selected sections of said web, said needle means operating to form said fibers as a visible pile on the downwardly facing side of said web to form said downwardly facing side as the front side of said fabric, with said upwardly facing side being formed as the back side of said fabric, and applying suction to the upwardly facing side of said web downstream of each one of said plurality of needling stations to withdraw from said web substantially all loose fibers of said one type delivered upstream of said one needling station and not attached to said web by said needle means of said one needling station, each of said needling stations having said needle means arranged thereat to apply said one type of fiber material delivered to each individual one of said plurality of needling stations in a pattern which constitutes one part only of said overall predetermined ornamental pattern to be produced, with intermittent passage of said web to all of said needling stations operating to provide the entire overall pattern upon said web, said suction means operating to insure that only said one type of loose fiber material delivered upstream of each one of said plurality of needling stations is needled into said web by said one needling station of said plurality of needling stations to avoid intermingling of one type of loose staple fiber material with another type of loose staple fiber material at an individual one of said plurality of needling stations.

4. Apparatus for producing needled nonwoven pile fabric having a back side and a front side, and consisting of a fabric web of backing material having needled thereinto loose staple fiber material forming a visible pile layer on the front side of said fabric comprising a plurality of needling stations each including needle means for needling said loose staple fiber material into said backing web in a predetermined pattern, means for intermittently passing said backing web through said needling stations with one side thereof facing upwardly and with its opposite side facing downwardly and for stopping said web with selected sections thereof located to be engaged by said needle means, means for delivering said loose staple fiber material upon said upwardly facing side of said web at a point upstream from each of said needling stations, said needle means being located on the upper side of said web and operable to attach said fiber material to said web in said predetermined pattern within the range of said selected sections of said web with said fiber material forming a visible pile on the downwardly facing side of said web to form said downwardly facing side as the front side of said fabric, with said upwardly facing side being formed as the backside of said fabric, and suction means located on the upper side of said web downstream of each of said needling stations to withdraw from said upwardly facing side of said web loose fiber material not attached thereto by said needle means, each of said needling stations having said needle means arranged thereat to apply said fiber material in a pattern which constitutes one section only of an overall predetermined pattern to be produced, with intermittent passage of said web through all of said needling stations operating to provide the entire overall pattern upon said web, said suction means operating to insure that only loose fiber material delivered upstream of each one of said needling stations is needled into said web by said one needling station to avoid intermingling between fiber material delivered upstream of different needling stations.

4,047,270

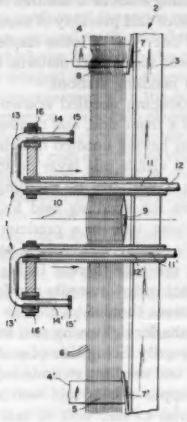
APPARATUS FOR SEPARATING OBJECTS

Heinz John, Berneck, Switzerland, assignor to Lindauer Dornier Gesellschaft mbH., Germany

Filed Sept. 4, 1974, Ser. No. 495,087
Int. Cl.[2] D03J *1/14;* B66C *1/02*
U.S. Cl. 28—205 1 Claim

1. An apparatus for separating objects, particularly for drawing off individual heddles from a pack, comprising two substantially U-shaped, pivotal, reciprocatable pipe means adapted to be mounted adjacent a pack of heddles and to

contact a heddle with the end thereof in the working position thereof,



magnetic means slidably mounted on said pipe means, and means for creating a partial vacuum in said pipe means.

4,047,271

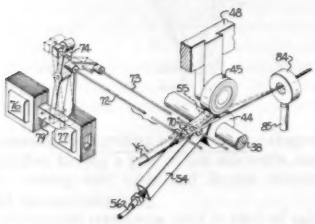
METHOD FOR SPACE DYEING YARN

James G. T. Paterson; Charles W. Watkins, both of Chattanooga, Tenn., and Grover G. Duckworth, Jr., Dalton, Ga., assignors to Interdye Technology Corporation, Dalton, Ga.

Filed Jan. 2, 1976, Ser. No. 646,352

Int. Cl.[2] D06B *1/14, 11/00*

U.S. Cl. 28—220 **16 Claims**



1. A method of applying dye to spaced apart portions of a yarn to provide a patterned color effect and characterized by high production and substantially complete penetration of the dye into the yarn, and comprising the steps of

advancing a yarn along a path of travel which is laterally spaced from the nip of a pair of operatively rotating applicator rollers, while

supplying a dye to the peripheral surface of at least one of the applicator rollers, and while

intermittently deflecting the advancing yarn into and out of the nip of the applicator rollers, such that those portions of the yarn which pass through the nip are subjected to a rapidly applied compressive force in the nip to cause the dye carried by the rollers to deeply penetrate into the yarn.

4,047,272

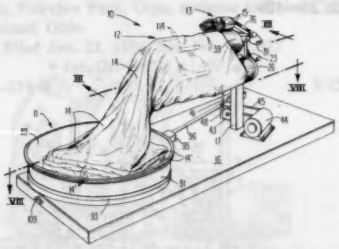
MACHINE FOR CONTINUOUS BIAS CUTTING OF TUBULAR FABRIC

J. Frank King, and Donald A. Sloan, both of Winston-Salem, N.C., assignors to Hanes Corporation, Winston-Salem, N.C.

Filed Dec. 29, 1975, Ser. No. 644,569

Int. Cl.[2] B21D *43/00*; B26D *3/16*; B65H *17/08*

U.S. Cl. 29—2.19 **14 Claims**



1. In a machine for continuously cutting an elongated tube of fabric into a plurality of individual helically cut strips and winding the cut strips into a plurality of fabric rolls, said machine including a support, fabric cutting and rolling means mounted on the support for cutting the fabric into strips and forming the strips into rolls, and a fabric supply spaced longitudinally from the support, the improvement comprising:

a. a plurality of skewable, longitudinally disposed, transversely spaced, rotatable cylinders mounted on the support for supporting the fabric tube in open condition and advancing the tubular fabric axially from the supply to the cutting means,

b. drive means for driving rotatably at least one of the cylinders, to cause the tubular fabric to rotate about its axis as the fabric advances to the cutting means,

c. adjustment means for skewing the cylinders selectively relative to the support, to cause the tube of fabric to advance to the cutting means at a selected rate of speed,

d. a rotatable receptacle for storing the supply of fabric,

e. drive means for rotating the receptacle,

f. speed adjustment means for correlating the speed of rotation of the receptacle with the speed of rotation of the tube of fabric as the fabric advances to the cutting means and

g. freely rotatable spreading means interposed between the receptacle and the cylinders to open and tension the fabric tube, said spreading means being rotated by the rotating and advancing tube of fabric to maintain the fabric under substantially uniform tension and to permit the fabric to remain substantially untwisted as it advances to the cylinders.

4,047,273

DEFLECTION COMPENSATING ROLL

Mario Biondetti, Schio, Italy, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Nov. 3, 1976, Ser. No. 738,561

Claims priority, application Switzerland, Nov. 5, 1975, 14255/75

Int. Cl.[2] B21B *13/02*

U.S. Cl. 29—116 AD **10 Claims**

1. A deflection compensating press roll comprising:

a. a stationary axial support beam having a central bore extending therethrough;

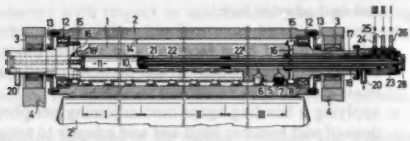
b. a roll shell rotatably disposed about said support beam to rotate thereabout;

c. a plurality of hydrostatic support elements positioned in engaged relation between said beam and said shell to exert forces therebetween;

d. a plurality of coaxial ducts disposed in the central bore of said axial support beam, said ducts being capable of trans-

mitting hydrostatic pressure fluid therethrough to feed said hydrostatic support elements, each of said ducts having apertures selectively positioned for entry and exit of hydrostatic pressure fluid;

e. means to selectively direct hydrostatic pressure fluid to said ducts for feeding said hydrostatic support elements with said fluid; and



f. sealing means selectively disposed in engaged relation with said coaxial ducts to define a plurality of separate of distinct sealed hydrostatic pressure fluid paths, each sealed hydrostatic pressure fluid path being associated in communicating relation with a group of at least on hydrostatic support element such that the hydrostatic pressure fluid directed to each group of said elements is independently selectable.

4,047,274

SUPPORT FOR CONTINUOUSLY CAST HOT METAL COMPONENTS

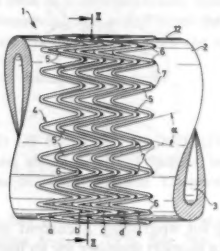
Rolf Lehmann, Mutschellen, AG, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Aug. 16, 1976, Ser. No. 714,365

Claims priority, application Switzerland, Aug. 18, 1975, 10705/75

Int. Cl.² B65G *47/00*

U.S. Cl. 29—121.4 **14 Claims**



1. An apparatus for supporting hot metal components such as continuously cast slabs produced in a continuous casting plant which comprises a generally cylindrical roll member having at least one generally elongated member configured to form at least one coil defining a series of undulations disposed about surface portions of the roll member, said undulations having substantially straight portions which extend at acute angles to each other and are connected by generally arcuate portions, said coil being secured to surface portions of said roll member at positions spaced thereabout and adapted to support said hot metal components.

4,047,275

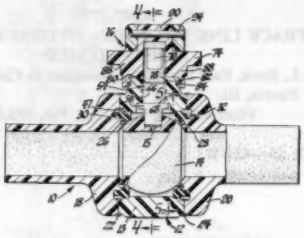
METHOD OF ASSEMBLING VALVES

Earl A. Bake, and Leonard J. Stephens, both of Pittsburgh, Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Sept. 17, 1975, Ser. No. 614,206

Int. Cl.² F16K *27/10*

U.S. Cl. 29—157.1 R **15 Claims**



1. A method of assembling a plastic ball valve having a unipartite housing comprising the steps of:

a. inserting a valve stem through a main body portion of the valve;

b. positioning a valve member in said main body portion in engagement with and rotatably by said stem;

c. mounting a valve seat and seat retainer in an end body portion of the valve;

d. heating by bringing a heater into intimate contact with area of said plastic ball valve at or near the inner end of said end body portion and one end of said main body portion; and

e. pressing said end of said body portions together for fusing.

4,047,276

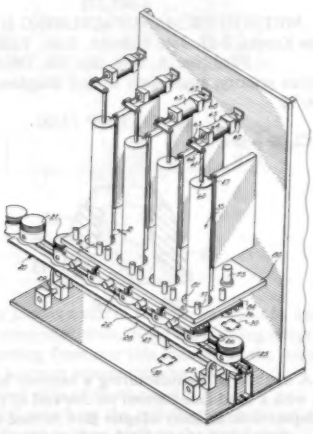
APPARATUS FOR DISPENSING RINGS AND FOR APPLYING PISTON RINGS TO PISTONS

Norbert C. Albers, Cincinnati, Ohio, assignor to Designeers Midwest, Cincinnati, Ohio

Filed Nov. 28, 1975, Ser. No. 636,057

Int. Cl.² B23P *19/08, 15/10*

U.S. Cl. 29—222 **13 Claims**



2. Apparatus for applying rings to pistons comprising:

a plurality of longitudinally spaced vertical tubes, each tube adapted to receive a stack of rings,

a lip projecting from the lower end of each tube,

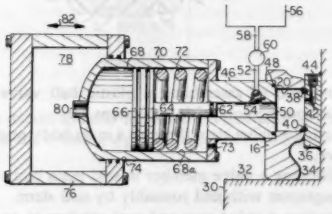
means for dropping rings one at a time onto said lip,
a ring spreader located adjacent each said lip to engage and spread open a ring,
means to lower each said spreader into position around a piston, and
conveyor means for advancing a series of longitudinally-spaced pistons sequentially into position under respective tubes, to receive rings one at a time.

4,047,277

TRACK LINK PIN BORE - HYDRAULICALLY PRESTRETCHED

Duane L. Burk, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 14, 1975, Ser. No. 595,650
Int. Cl.[2] B23P *17/00, 19/02*
U.S. Cl. 29—421 R **3 Claims**



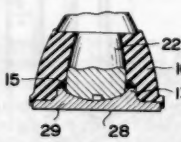
1. A method of preparing a pin in tight press-fitting relation within a bore in a workpiece, comprising:
sizing and locally strengthening a bore in a workpiece by the steps comprising:
establishing a predetermined size for the bore;
forming an undersized version of said bore in a workpiece;
increasing the size of said bore by the steps of applying a hydrostatic pressure to the walls of said bore, raising said pressure to exceed the yield strength of said workpiece locally of the walls of said bore and continuing said pressure until the walls of said bore have yielded and deformed to said predetermined size and been locally strengthened; and
press-fitting a pin within said bore.

4,047,278

METHOD OF MANUFACTURING HAMMER

Yoshio Kurata, 2-17, Joto 5-chome, Kofu, Yamanashi, Japan

Filed Nov. 8, 1976, Ser. No. 739,488
Claims priority, application United Kingdom, Apr. 20, 1976, 15914/76
Int. Cl.[2] B23P *17/00*
U.S. Cl. 29—424 **9 Claims**



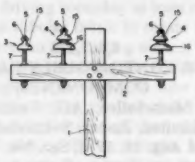
1. A method of manufacturing a hammer having a hammer head with a head face formed on one end of the hammer, and an adapter with an inner adapter face formed on the inner side of the adapter and a working face formed on the opposite side of the adapter for striking a workpiece, said hammer head and said adapter being secured to each other through a resilient connecting member and with said head face and said adapter inner face being in contact with each other in a predetermined positional relationship therebetween so that upon impact applied on said working face said adapter is rotated about its central axis with respect to said hammer head against the resilient force of said connecting member in a direction from a predetermined position, and upon removal of the impact force said adapter returns automatically to its original position by means of the resilient force of said connecting member, comprising the steps of:
a. applying lubricant to the contact area of said head face and said adapter face;
b. positioning said hammer head and said adapter to each other with said head face and said adapter inner face in contact with each other in said predetermined positional relationship;
c. applying a bonding agent onto adjoining peripheral portions of said hammer head and said adapter to temporarily bond said hammer head and said adapter to each other; and
d. providing heat melted thermo-meltable elastic material over peripheral portions of said hammer head and said adapter including therebetween said bonding agent which has been applied to said adjoining peripheral portions so as to form said resilient connecting member with said elastic material to permanently secure said hammer head and said adapter to each other.

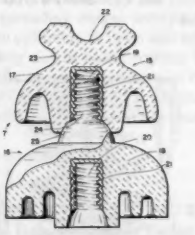
4,047,279

UPGRADING CURRENT DISTRIBUTION INSULATORS

Ernest E. Pettit, Independence, Mo., assignor to W. Leon Sell; Ernest E. Pettit and R. Don Sell, all of Independence, Mo.

Filed Oct. 26, 1976, Ser. No. 735,829
Int. Cl.[2] H02G *1/00;* **H01B** *17/20*
U.S. Cl. 29—426 **5 Claims**





1. A method for upgrading a current distribution system which includes a support member for an insulator, a mounting stud that is externally threaded at one end and the other end of which is secured to the support member, an existing insulator having a threaded receptacle therein and which is thereby attached to the threaded end of the mounting stud, and a current conductor attached to the existing insulator, comprising the steps of:
a. unsecuring said mounting stud from said support member, said mounting stud when unsecured being rotatable within a channel which extends through said support member, the mounting stud having a base that abuts the support member externally of said channel and an extension below the base which passes through said channel and external threads on the outer end of said extension and a nut on said

threads, and wherein the mounting stud is unsecured by loosening the nut without removing the same from said stud;

b. detaching the mounting stud from the existing insulator by rotation of the stud as it remains within said channel, said existing insulator including an upper conductor receiving means wherein the current conductor is received and including securing means connected with said insulator and said current conductor for retaining said current conductor with respect to said insulator and preventing relative rotation between said insulator and said current conductor;

c. attaching said stud to an additional insulator;

d. attaching the additional insulator to the existing insulator, and

e. resecuring said stud to the support member, and wherein said current conductor remains attached to the existing insulator during execution of the aforesaid steps.

4,047,280

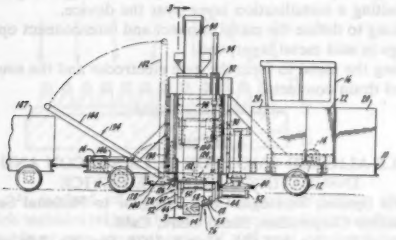
METHOD FOR REMOVING TIES UNDER RAILROAD TRACK

Andrew M. Dieringer, Waterford, and Ervin M. Sheperd, Milwaukee, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Continuation of Ser. No. 452,007, March 18, 1974, abandoned. This application Aug. 5, 1976, Ser. No. 711,804

Int. Cl.² B23P *19/02*

U.S. Cl. 29—427 **32 Claims**



1. A method usable in removing plate cut ties from beneath tie plate supported rails of a railroad track, including the step of simultaneously removing the wood from the top of the tie and removing the tie plates from between the rails and ties.

4,047,281

METHOD OF SETTING BLIND RIVETS

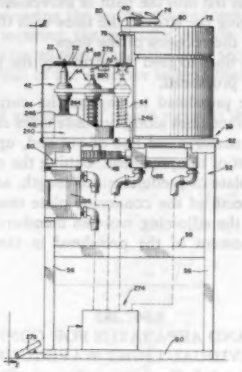
Anthony E. Di Maio, and Joseph G. Todisco, both of Georgetown, Mass., assignors to Marson Corporation, Chelsea, Mass.

Division of Ser. No. 581,954, May 28, 1975, Pat. No. 4,005,519. This application Aug. 17, 1976, Ser. No. 715,002

Int. Cl.² B23P *19/00*

U.S. Cl. 29—429 **5 Claims**

1. A method for enabling the continuous and automatic setting of blind rivets having a head portion and a mandrel which comprises the steps of feeding individual rivets to respective ones of a plurality of rivet holding assembly means at a loading station, successively and incrementally advancing the rivets in a first predetermined path such that they travel from at least the loading station to a working station, automatically displacing respective ones of the rivet mandrels operatively held by the holding assemblies at the working station in a second predetermined path such that the rivet mandrel is ruptured and the remainder of the rivet is set in the material, and supporting the material to be riveted in a generally horizontal plane at the working station such that the rivet is situated above the plane for enabling insertion into the workpieces.



4,047,292

METHOD OF JOINING WOODEN MEMBERS

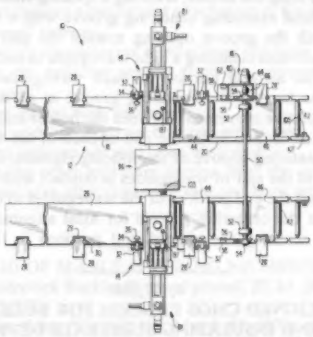
John Calvin Jureit, Coral Gables; Adolfo Castillo; Roy Leutwyler, both of Miami; Larry Brodsky, Sunrise, and Ben Kushner, Miami, all of Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Division of Ser. No. 565,756, April 7, 1975, Pat. No. 3,985,278, which is a continuation-in-part of Ser. No. 488,006, Dec. 12, 1974, Pat. No. 3,913,816, which is a continuation of Ser. No. 317,095, Dec. 20, 1972, abandoned. This application Apr. 19, 1976, Ser. No. 678,393

The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.

Int. Cl.² B23P *11/00*

U.S. Cl. 29—432 **28 Claims**



1. A method for joining a pair of wooden members by applying a sheet metal connector plate, of the type having integrally struck teeth projecting from one side thereof, to the wooden members at their juncture comprising the steps of:

providing a coiled strip of sheet metal,

feeding the metal strip from the coil through a die set,

actuating said die set to form teeth in the metal strip,

feeding the metal strip with the teeth formed therein into the path of movement of a presshead carrying a cutting edge thereby defining relative to the cutting edge a predetermined line of cut along the metal strip,

providing a reaction surface cooperable with the cutting edge and comprising a guide surface with a plurality of tines defining a plurality of laterally spaced recesses,

locating and guiding the teeth of the strip along the recesses as the strip is fed into the path of movement of the presshead, engaging the strip to the tines with the teeth of the strip within the recesses of the tines

advancing the tines to feed the strip into the path of movement of the presshead,

displacing the presshead to engage the cutting edge and reaction surface tines along opposite sides of the strip and along its predetermined line of cut and, upon continued displacement of the presshead, cutting the strip to form a connector plate of predetermined length, and

pressing the teeth of the connector plate thus formed into one side of the adjoining wooden members upon continued displacement of the presshead in the same stroke thereof.

4,047,283

METHOD AND APPARATUS FOR CONNECTING INDIVIDUAL LIGHT WAVEGUIDES

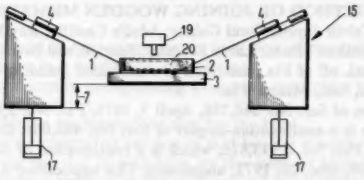
Dieter Kunze, Neuried, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 1, 1976, Ser. No. 701,497

Claims priority, application Germany, July 10, 1975, 2530883

Int. Cl.[2] G02B 5/14

U.S. Cl. 29—466 **12 Claims**



1. A method of connecting a pair of individual light waveguides in end-to-end light transmitting relationship in a splicing element, said method comprising providing a splicing element holder and a pair of spaced waveguide clamping devices which are spaced from the holder; securing a splicing element having a longitudinal extending centering groove with a base in the holder with the groove opening toward the pair of spaced clamping devices clamping a light waveguide in each clamping device with an end portion of each waveguide extending toward the base of the centering groove at an acute angle; creating relative movement between the holder and the pair of clamping devices to insert the end of each of the waveguides into the centering groove of the splicing element, to bring the end faces of the pair of waveguides in contact with each other and to cause the end portions of the waveguides to bend and to move into the centering groove for axial alignment therein; and then securing the aligned end portions in the splicing element.

4,047,284

SELF-ALIGNED CMOS PROCESS FOR BULK SILICON AND INSULATING SUBSTRATE DEVICE

Gregorio Spadea, Saratoga, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 575,655, May 8, 1975, Pat. No. 3,983,620. This application June 17, 1976, Ser. No. 697,178

Int. Cl.[2] B01J 17/00

U.S. Cl. 29—571 **2 Claims**

1. The method for manufacture of a silicon semiconductor device comprising the steps of:

forming a first oxide layer over the surface of a semiconductor substrate of a first conductivity type,

masking said first oxide layer and thereafter etching an opening in said first oxide layer over a first region in said substrate,

diffusing a dopant into said first region to form a region of a second conductivity type in said substrate,

removing the remainder of said first oxide layer,

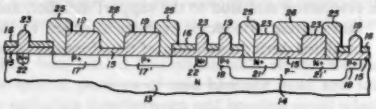
forming a second oxide layer over the surface of said substrate,

forming a silicon nitride layer over said second oxide layer,

masking and etching said silicon nitride and said second oxide layer to form openings therein spaced from said first region,

diffusing a dopant through said latter openings to form source and drain regions of said second conductivity type in said substrate, thus forming a silicon oxide layer in said exposed opening,

masking and etching said silicon nitride and said second oxide layer to form openings therein over said first region,



diffusing a dopant through said latter openings to form source and drain regions of said first conductivity type in said first region, thus forming a silicon oxide layer in said exposed openings,

masking and etching a portion of the silicon oxide layer over each of the source and drain regions to form contact openings to said regions, said silicon nitride layer serving as an outer boundary mask for said openings over said source and drain regions,

etching away said silicon nitride layer at said gate regions,

depositing a metallization layer over the device,

masking to define the metal connect and interconnect openings in said metal layer, and

etching the metal to form the gate electrodes and the source and drain connects.

4,047,285

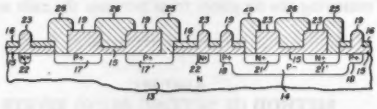
SELF-ALIGNED CMOS FOR BULK SILICON AND INSULATING SUBSTRATE DEVICE

Gregorio Spadea, Saratoga, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 575,655, May 8, 1975, Pat. No. 3,983,620. This application June 17, 1976, Ser. No. 697,290

Int. Cl.[2] B01J 17/00

U.S. Cl. 29—571 **1 Claim**



1. The method for manufacture of a silicon semiconductor device comprising the steps of:

forming a first oxide layer over the surface of a semiconductor substrate of a first conductivity type,

forming a silicon nitride layer over said first oxide layer,

masking said layers and thereafter etching openings through said layers such that said silicon nitride layer and said oxide layer are left at those regions where drain, source and gate regions are to be subsequently formed,

masking all those regions where channel transistors of said first conductivity type are not to be formed and leaving exposed those regions where such channel transistors are to be formed in said substrate,

ion implanting a thin layer of a second conductivity type in said first conductivity type channel transistor regions in said substrate,

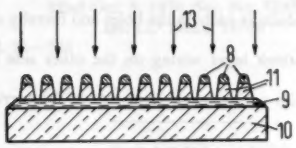
removing said last mentioned mask and driving said ion implanted layer into said substrate,

growing a thermal oxide layer over those regions not protected by a silicon nitride layer,
masking and etching said silicon nitride layer and first oxide layer to form openings at the second conductivity type channel transistor source and drain regions,
diffusing a dopant through said latter openings to form source and drain regions of said conductivity type in said substrate,
masking and etching said silicon nitride layer and first oxide layer to form openings at the first conductivity type channel transistor source and drain regions,
diffusing a dopant through said latter openings to form source and drain regions of said first conductivity type in said substrate,
etching the silicon nitride layer at the gate regions,
depositing a metallization layer over the device,
masking to define the metal connect and interconnect openings in said metal layer,
and etching the metal to form the gate electrodes and source and drain connects.

4,047,286
PROCESS FOR THE PRODUCTION OF SEMICONDUCTOR ELEMENTS

Udo Lob, Eichenau, and Fritz Scheidel, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 13, 1976, Ser. No. 686,137
Claims priority, application Germany, May 20, 1975, 2522346
Int. Cl.² B01J *17/00*
U.S. Cl. 29—578 **7 Claims**



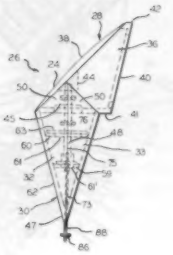
1. A method of manufacturing semiconductor elements which includes taking a large-area semiconductor wafer, forming at least two zones therein of different conductivity type, metallizing at least one side of said large area wafer, forming a soft-solder layer on one metallized side, bringing a perforated plate under pressure against said soft-solder layer while the soft-solder is raised to its melting temperature, the perforations in said perforated plate corresponding to the size and shape of the small-area wafers to be formed, whereby surfaces are formed some of which are covered by soft-solder and some of which are not covered by soft-solder, cooling the large-area wafer and withdrawing said perforated plate, subjecting the said surfaces to a sand blast with said soft-solder surfaces acting as a mask, thereby causing the unmasked non-soldered areas of said large area wafer to be removed leaving only the number of small areas still covered by the solder.

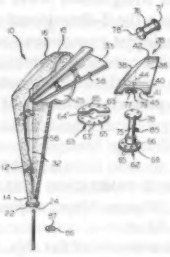
4,047,287
METHOD FOR FORMING A HIGH FREQUENCY ANTENNA

Howard H. Hubbard, Scituate, and Thomas P. Walsh, Marshfield, both of Mass., assignors to Antennas for Communications, Inc., Ocala, Fla.

Continuation of Ser. No. 328,370, Jan. 31, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,629
Int. Cl.² H01Q *17/00*; B28B *7/10*
U.S. Cl. 29—600 **9 Claims**

1. A method for forming a horn-reflector antenna from a mold having at least two horn sections for forming the horn portion of the antenna and a reflector section for forming the reflector portion of the antenna, each of said horn sections having a lower apex end and an upper end of greater circumference than the apex end for forming respectively the apex end and upper end of the horn portion of the antenna, said reflector section including a front end for forming the antenna portion defining said open area, and the method comprising:
removably securing the horn sections together;
removably securing the reflector section to said secured horn sections, so that one of the horn sections is closer to the front end of the reflector section than the other horn section;
forming said antenna is a single piece so that the inner antenna surface conforms substantially to the outer surface of said attached horn and reflector sections of said mold without causing a permanent attachment of the mold with the formed antenna;





disconnecting the reflector section from the horn sections;
removing the reflector section from the antenna via said open area;
disconnecting the horn sections;
removing said one horn section closest to said open area from the antenna via said open area; and
removing the other said horn section from the antenna via said open area after removing said one horn section.

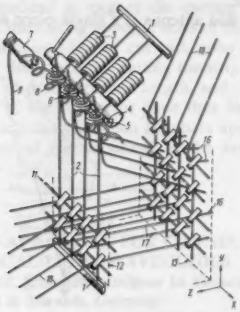
4,047,288
METHOD OF MANUFACTURING 3-D MEMORIES

Jury Alexandrovich Burkin, Tsvetnoi proezd, 29, kv. 24, Novosibirsk, U.S.S.R.

Continuation of Ser. No. 562,118, March 26, 1975, abandoned. This application Mar. 17, 1976, Ser. No. 667,585
Claims priority, application U.S.S.R., Apr. 3, 1974, 2011776; Apr. 8, 1974, 2016331
Int. Cl.² H01F *41/08*
U.S. Cl. 29—604 **4 Claims**

1. A method of manufacturing triple coincidence access 3-D memories comprising the steps of:
a. providing a plurality of flat two dimensional matrices, threaded with wires along three directions of the Cartesian system, by the steps of:
arranging wires prestrung with cores in a first coordinate direction;
securing said wires under tension in pick-up assemblies;

detaching the cores on said wires and orienting said cores in rows along a second coordinate direction;
threading the cores in each of said rows in the second coordinate direction by wires coiled into helices;
threading the cores in each of said rows in a third coordinate direction;
straightening each of said helices to form lines of cores along said second coordinate direction; and



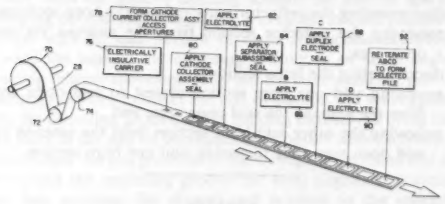
fixing said straightened wires and said pick-up assembly wires in a flat **2-dimensional** matrix;
b. moving said flat two-dimensional matrix along the wires of said third coordinate direction; and
c. securing said third coordinate direction wires of said matrix in pick-up assemblies of the 3-D memory.

4,047,289

METHOD FOR FORMING A SLURRY BATTERY CELL

Otto E. Wolff, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 514,458, Oct. 15, 1974, abandoned. This application June 7, 1976, Ser. No. 694,026
Int. Cl.² H01M *4/04*
U.S. Cl. 29—623.4 **11 Claims**



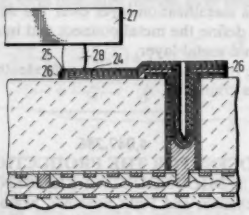
1. The method of forming a planar battery cell electrode comprising a particulate dispersion of active electrode material in aqueous electrolyte, comprising the steps of depositing a dispersion of said particulate active electrode material in a solution of water and a water-soluble binding agent on at least a portion of the surface of a select component of said cell, drying said dispersion sufficiently to provide a manipulatory laminar subassembly of said particulate material adhered to said component by said binding agent, positioning said subassembly at an electrode defining site, and wetting said particulate material with an aqueous electrolyte solution in which said binding agent is soluble to dissolve said binding agent and thereby form an aqueous slurry of said particulate material.

4,047,290

PROCESS FOR THE PRODUCTION OF A MULTI-CHIP WIRING ARRANGEMENT

Artur Weitze, and Michail Sapunarow, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 2, 1975, Ser. No. 609,687
Claims priority, application Germany, Sept. 10, 1974, 2443287
Int. Cl.² H05K *3/06, 3/10*
U.S. Cl. 29—625 **6 Claims**



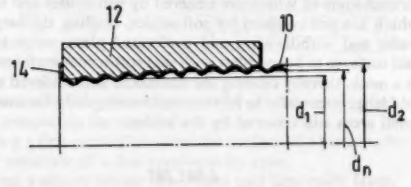
1. A method for producing a multi-chip wiring arrangement on a carrier comprising the steps of:
forming through holes in the carrier,
metallizing and galvanically strengthening the walls and edge zones of the holes on one side of the carrier,
filling the holes on the other side of the carrier with a conductive paste,
baking the conductive paste in the holes and thereby sealing the same,
forming multi-thick layer wiring on the other side of the carrier and
forming thin film wiring on said one side of the carrier.

4,047,291

METHOD OF RESHAPING TUBULAR CONDUCTOR SHEATH

Georg Spinner, Erzgiessereistr. 33, Munich 2, Germany

Continuation of Ser. No. 494,998, Aug. 5, 1974, abandoned. This application Dec. 23, 1975, Ser. No. 643,629
Claims priority, application Germany, Aug. 3, 1973, 2339443
Int. Cl.² H01P *11/00;* H01R *43/00*
U.S. Cl. 29—628 **12 Claims**

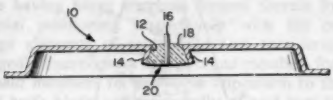


1. A method of reshaping a tubular conductor sheath or the like, comprising:
providing a conductor sheath or the like having a first, normal, external diameter; providing a clamping sleeve having an opening with an inside diameter that is smaller than the sheath normal diameter;
moving an end of the sheath or the like into and through the sleeve opening and by such movement radially deforming the sheath or the like inwardly to effect a transformation which permits a reflection free transition to an adjoining fitting or the like.

4,047,292
PROCESS FOR FORMING AN ELECTRICALLY INSULATING SEAL BETWEEN A METAL LEAD AND A METAL COVER

Paul C. Shaffer, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 19, 1976, Ser. No. 743,306
Int. Cl.[2] H01B *17/26*
U.S. Cl. 29—630 R 4 Claims

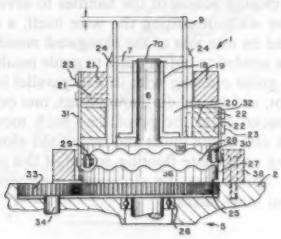


1. A process for producing a glass-to-metal seal in an apertured metal body which comprises the steps of: positioning said apertured metal body; positioning a metal lead substantially centrally located within said aperture; placing a sealing glass in said aperture; firing said body, lead and sealing glass at a temperature high enough to achieve melting of said sealing glass and effecting a bond between said body, said lead and said glass to form said glass-to-metal; grinding at least one surface of said lead flush with said glass; and refiring said body and said glass-to-metal seal.

4,047,293
OSCILLATING BLADE WINDING INSERTION DEVICE

Vernon E. Kieffer, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 5, 1976, Ser. No. 729,815
Int. Cl.[2] H02K *15/06*
U.S. Cl. 29—736 12 Claims

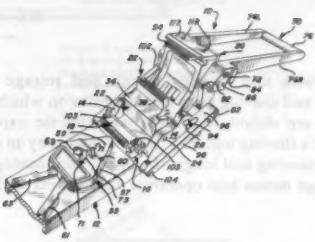


1. A winding insertion device, comprising:
a supporting platform:
a stripper operatively connected to and movable with respect to said supporting platform;
a plurality of wedge guides mounted to said supporting platform;
a first blade holder movably mounted on said supporting platform;
a second blade holder axially aligned with said first blade holder and movably mounted on said supporting platform, said first and said second blade holders being relatively movable with respect to one another independent of movement of said stripper;
a first plurality of blades arranged in an annular pattern, said first plurality of blades being mounted to said first blade holder;
a second plurality of blades arranged in an annular pattern and mounted to said second blade holder, the annular pattern of said first and said second blade pluralities forming a single annular array, blades of said first and said second blade pluralities being alternately arranged with respect to one another in said array; and
means for moving at least one of said first and said second blade holders with respect to the other of said first and said second blade holders so as to provide relative movement between said first and second blade pluralities during winding insertion.

4,047,294
WIRE TERMINATING TOOL

James R. Quigley, Lombard, Ill., assignor to TRW Inc., Elk Grove Village, Ill.

Filed Feb. 9, 1976, Ser. No. 656,580
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—749 7 Claims



1. In an apparatus for effecting solderless termination of a plurality of wires in a connector having oppositely disposed series of open-sided wire-receiving channels, each of said channels having wire-gripping means disposed therein, the combination comprising a base having a connector-mounting nest mounted thereon; said nest supportingly receiving said connector with one series of channels disposed upwardly in substantially the horizontal plane in the normal position of apparatus use; said nest being detachably mountable on said base in a plurality of positions and supportingly engaging a multi-wire connector of a particular construction in each of said positions; means defining guide passages movable between positions remote from and in overlying relation with said one series of channels; the guide passages of said means being in aligned superposed relation with said connector channels when in overlying relation therewith and including upwardly open portions for receiving said wires; stuffing blade means mounted on said apparatus; means for moving said stuffing blade means through a terminating stroke when said guide passages are in overlying relation with said one series of channels; said guide passages and connector channels being disposed in the path of said stuffing blades in the course of said terminating stroke whereby said stuffing blades drive wires disposed in said guide passages through said guide passages into said connector channels and into engagement with said wire gripping means.

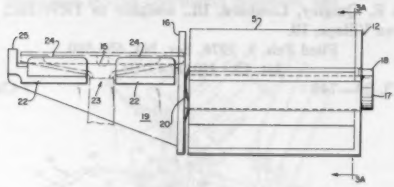
4,047,295
SHAVING UNIT DISPENSER CONTAINER

John Frederick Francis, Woking, England, assignor to The Gillette Company, Boston, Mass.

Filed Apr. 15, 1976, Ser. No. 677,491
Claims priority, application United Kingdom, Apr. 29, 1975, 17796/75
Int. Cl.[2] B26B *21/24;* B65D *83/10*
U.S. Cl. 30—40.2 9 Claims

1. A dispensing container for shaving units having blade means permanently fixed to a body member having a guard portion and connector means by which the unit is slidably attachable to a head portion of a razor handle, said dispensing container comprising storage means for mounting a plurality of said shaving units such that said blade means are covered by portions of said storage means and portions of said body member are exposed, and locating means engageable by said head

portion of said razor handle to locate said head portion of said handle in a predetermined position, said storage means being rotatably coupled to said locating means whereby said storage means may be rotated relative to said locating means so that said units mounted in said storage means may be brought in turn into a position adjacent said head portion of said handle



engaged with said locating means, said storage means for mounting said shaving units including ribs on which said shaving units are slidably disposed, whereby the exposed body portion of a shaving unit may be manipulated by an operator to slide said shaving unit longitudinally of said shaving unit from said storage means into operative engagement with said handle.

4,047,296

TWO-EDGE SHAVING BLADE UNIT HAVING ANTI-CLOGGING MEANS

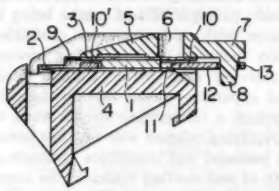
Minoru Ishida, Gifu, and Shigeru Ozeki, Seki, both of Japan, assignors to Feather Safety Razor Company, Ltd., Osaka, Japan

Filed July 27, 1976, Ser. No. 709,142

Claims priority, application Japan, July 31, 1975, 50-10702[U]

Int. Cl.² B26B *21/22, 21/40*

U.S. Cl. 30—41 **3 Claims**



1. A two-edge shaving blade unit comprising:

a platform portion,

a cap portion,

two blade elements fixed between said platform and cap portion, said blade elements being disposed parallel to each other in spaced relation to provide the leading and following cutting edges,

spacer means fixed between said platform and cap portions for retaining said blade elements in spaced relation, said spacer means comprising an elongated flat member supported between said blade elements,

means disposed between two said blade elements for ejecting the shaved hair particles and other matter deposited therebetween, said ejecting means comprising a flat member formed with an opening loosely fitting around said spacer means and being displaceable between an advanced and a retracted portion and ordinarily retained in the retracted position, and

means for manually retractably displacing said ejecting means into the advanced position.

4,047,297

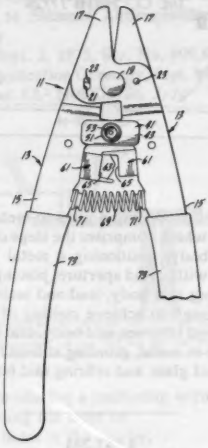
PRECISION SMALL WIRE STRIPPER

Ronald P. Hanson, Sycamore, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Filed Sept. 5, 1975, Ser. No. 610,537

Int. Cl.² H02G *1/12*

U.S. Cl. 30—90.1 **5 Claims**



1. In a hand tool for cutting and stripping the insulation from insulated electric wires, a pair of elongated members pivotally connected intermediate their ends providing handles at one end for manual manipulation and cutting blades at the other end, insulation cutting dies on each member with their axis spaced from and parallel to the pivot cooperable upon an opening and closing action of the handles to sever the insulation on a wire without cutting the wire itself, a unitary wire guide mounted on one side of the elongated members in alignment with the insulation cutting dies to guide insulation thereto and having a guide opening with its axis parallel to and spaced from the pivot, and two sliding mountings, one on each end of the guide, spaced from the pivot, one such mounting being between each end of the guide and one of the elongated members providing an arcuate floating action of the guide relative to the guide opening as the elongated members are moved during manual manipulation.

4,047,298

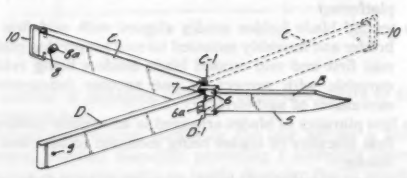
COMBINATION SHEATH AND RIGID HANDLE FOR KNIFE BLADES AND THE LIKE

Donald T. Philippar, Box 535, Sturgis, S. Dak. 57785

Filed July 1, 1976, Ser. No. 701,691

Int. Cl.² B26B *29/02*

U.S. Cl. 30—153 **4 Claims**



1. In combination with a knife blade or the like having relatively broad sides and an attachment butt with substantially parallel, broad attachment surfaces,

a combination handle and protective sheath for said knife blade comprising a pair of elongate, substantially flat

members having widths somewhat greater than the maximum width of said knife blade and hingedly attached at corresponding ends to the respective surfaces of the butt of said blade and thereby spacing said elongate members apart a distance slightly greater than the thickness of said knife blade,

the attachment surfaces of said butt having outstanding hinge elements affixed thereto with the axes of said elements being disposed transversely of said butt surfaces,

the hinged attachment ends of said substantially flat members having hinge elements formed therein for complemental positioning respectively with the outstanding hinge elements of said blade butt to operatively and hingedly interconnect said butt and members for swinging of said members forwardly in opposition to the sides of said knife blade and rearwardly of said butt to opposed position jointly constituting a handle for said blade,

one of said members adjacent its unhinged end carrying a pin projecting in opposition to the other elongate member when said members are swung fully rearwardly to jointly form said handle,

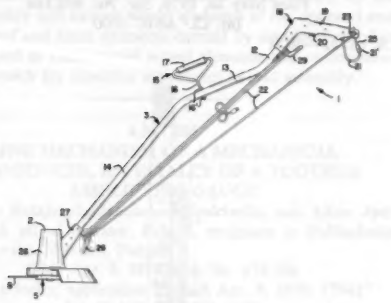
and said opposing elongate member having a recess near its unhinged end for receiving and interlocking with said pin.

4,047,299

APPARATUS FOR TRIMMING VEGETATION

Lester E. Bair, Brownsville, Tex., assignor to Garden Pro, Inc., Dallas, Tex.

Filed Jan. 30, 1976, Ser. No. 653,884
Int. Cl.[2] A01D *55/18*; B26B *27/00*
U.S. Cl. 30—276 **7 Claims**



1. An apparatus for trimming vegetation compising:

a. drive means connected to a drive shaft and capable of rotating same at a speed of up to ten thousand (10,000) RPM;

b. an open bottom housing member mounted at its central point on said driven shaft and rotatable thereby, said member having a peripheral wall portion spaced from said driven shaft with a radial passage therethrough;

c. a relatively stiff non-metallic cutting line with suitable flexibility and a portion in a coil substantially coaxial of said driven shaft and an uncoiled portion extending initially tangentially from said coiled portion and through said radial passage and continuing radially outwardly in a cutting plane;

d. spool means coaxially supported on said driven shaft and supporting said coil of cutting line, said spool means being movable longitudinally of said driven shaft and rotatable relative to said member for adjusting the length of cutting line extending outwardly of said radial passage;

e. resilient means engaging said housing member and spool means to urge the spool means outwardly relative to said open bottom of the housing member; and

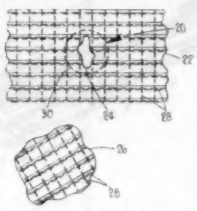
f. means on said driven shaft and said spool means engageable to limit said outward movement of said spool means and to key same to said shaft for rotation therewith, said means on the driven shaft and spool means being released in response to predetermined inward movement of said spool means relative to said housing means to permit relative rotation thereof.

4,047,300

METHOD AND APPARATUS FOR REPAIRING DAMAGED MATERIALS PARTICULARLY SUITED TO REPAIRING KNIT OR POLYESTER MATERIALS

John L. Sweeney, Jr., 4300 NE. Sunset Blvd. No. B6, Renton, Wash. 98055

Filed Dec. 22, 1975, Ser. No. 642,897
Int. Cl.[2] B32F *1/32*
U.S. Cl. 30—358 **9 Claims**



1. An apparatus, for manual operation, for cutting materials particularly suited for cutting clothing fabric comprising:

a. a cutting die having a flat surface and a hole passing through the surface normal to the surface whereby a sharp edge is defined along the perimeter of the hole at the intersection with the flat surface;

b. a punch having a longitudinally tapered surface end, creating in transverse cross section the shape of the hole, which will contact the perimeter of the hole to permit the cutting of a hole in the material, when the material is interposed between the punch and the die, and they are brought together;

c. a body having a central cavity containing the punch with the contact surface of the punch extending from the first end of this central cavity;

d. means for retaining the contact surface of the punch at the first end of the cavity such that the surface of the contact surface of the punch extends from the cavity to permit full contact with the corresponding hole in the die;

e. a shaft longitudinally positioned in the central cavity with the first shaft end adjacent the punch and the second shaft end extending from the rear of the cavity; and

f. means for biasing the shaft relative to the body so that the punch may be forcefully driven against the die by first withdrawing the shaft from the rear of the central cavity against the force of the biasing means and then releasing the shaft such that the shaft is driven by the force of the biasing means and impacts against the punch opposite the contact surface of the die and the punch is then moved against the die.

4,047,301

DENTAL HANDPIECE

Eugen Eibofner, Biberach, Germany, assignor to Kaltenbach & Voigt, Biberach an der Riss, Germany

Filed May 7, 1976, Ser. No. 684,453
Claims priority, application Germany, May 13, 1975, 2521313
Int. Cl.[2] A61C *1/10*
U.S. Cl. 32—27 **10 Claims**

1. A dental handpiece comprising a holding sleeve **(1)**;

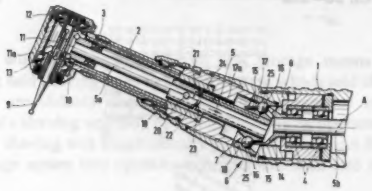
a head sleeve **(2)** connected to said holding sleeve **(1)** and adapted to mount rotatably a dental tool **(9)**, said head sleeve **(2)** having its lognitudinal axis inclined relative to the longitudinal axis of the holding sleeve **(1)**;

a connecting zone providing an interconnection between said holding sleeve (1) and said head sleeve (2);

a two-drive shaft housed within the handpiece, a first part (5*b*) of the shaft (5) being arranged within the holding sleeve (1) and a second part (5*a*) of the shaft (5) being arranged within the head sleeve (2);

a transmission (7) providing a drive connection between said first and second parts (5*b*, 5*a*) of the shaft (5), said transmission (7) being housed within said connecting zone;

wherein the transmission comprises a ball-type planetary transmission (7) including an inner ring (17), an outer ring (18), balls (16) frictionally engageable between said rings; a cage engaging said balls (16); one of said parts (5*b* or 5*a*) of the drive shaft (5) is coupled drivingly with said cage, one of said rings (17 or 18) is non-rotatably mounted in



said connecting zone, and a coupling element (19) is secured to the other of said parts (5*a* or 5*b*, respectively) of the shaft (5); the other of said rings (18 or 17, respectively) is coupled with said other parts (5*a* or 5*b*, respectively) of the shaft (5) for rotation therewith, said other ring (18 or 17, respectively) having a drive transmitting connection with said coupling element (19) and being axially displaceable relative to said other part (5*a* or 5*b*, respectively) of the shaft (5) in order to adjust the frictional engagement of said balls (16) between said inner and outer rings (17 and 18) thereby to alter the value of torque transmissible by the shaft (5);

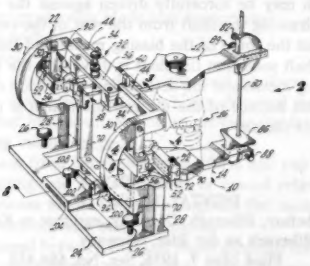
and wherein said drive transmitting connection comprises interengaging helical teeth (22, 23) provided on said coupling element (19) and on said other ring (18 or 17, respectively).

4,047,302

DENTAL ARTICULATOR

Arthur W. Cheythey, 712 S. Wilton Ave., Los Angeles, Calif. 90005

Filed Jan. 14, 1976, Ser. No. 649,135
Int. Cl.² A61C *11/00*
U.S. Cl. 32—32 **6 Claims**



1. In a dental articulator having a lower member for mounting a lower tooth model and an upper member for mounting an upper tooth model, the improvement comprising:

mounting means for supporting said upper member in stationary relationship with respect to said mounting means;

a pair of upper articulating elements carried by said mounting means and having internal surface contours closely conforming to the surface contours of the fossae forming the upper members of a human mandibular joint;

a pair of lower articulating elements attached to said lower member in operative relationship with said upper articulating elements and having external surface contours closely conforming to the surface contours of the mandibular condyles forming the lower members of a human mandibular joint;

means for adjusting the angular orientation of said upper and lower articulating elements to conform with measured characteristics of a particular patient's mandibular joint;

means for adjusting the lateral spacing of said upper and lower articulating elements to conform with measured characteristics of a particular patient's mandibular joint; and

means for urging corresponding ones of said upper and lower articulating elements together and thereby holding them in continuous contact;

whereby said lower member can be moved relative to said upper member in close simulation of actual movements of the particular patient's lower jaw.

4,047,303

GUIDE FOR SETTING UP ARTIFICIAL TEETH

Henry Ziofsky, Rte. 55, Eldred, N.Y. 12732, and Brett Jason Sinclair, 150-11 72nd Road, Flushing, N.Y. 11367

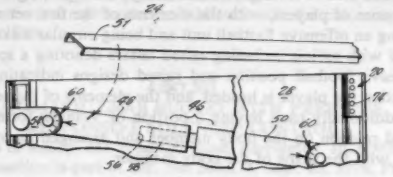
Filed May 26, 1976, Ser. No. 690,146
Int. Cl.² A61C *3/00*
U.S. Cl. 32—40 R **7 Claims**

1. A dental guide for setting up teeth on a model, said guide comprising, in combination, a guide strip of transparent material having an upper edge, a lower edge, and being of flexible, non-elastic material, a vertical center line on said strip, parallel height lines along the upper edge of said strip, first markings on said strip on each side of said center line indicating at least the average width of first anterior teeth, second markings on said strip on each side of said center line indicating the range of the width of the three anterior teeth on each side, measuring scales on said strip extending from said center line toward each end of said guide strip along the lower edge of said strip, indicating means on said strip having a downward facing angle to be placed adjacent to the phrenum of a model, and means joining the ends of said guide strip to fix said guide strip about a model.

4,047,304
DRAFTING BOARD WITH ADJUSTABLE STRAIGHT-EDGE ASSEMBLY

Anthony Deire, Jr., 7570 Tropicana St., Miramar, Fla. 33023

Filed June 1, 1976, Ser. No. 691,387
Int. Cl.[2] B43L 5/00
U.S. Cl. 33—80 7 Claims

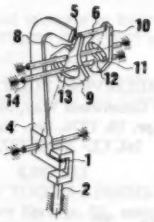


1. A drafting board comprising in combination:
a pair of laterally spaced base members;
support means for pivotably mounting said base members;
a drawing surface mounted on said base members having front, rear and side edges;
a straight-edge assembly, including at least one ruling edge, carried by said drawing surface and extending laterally thereof, said at least one ruling edge being positionable to extend across said drawing surface in any of a plurality of angles relative to the front edge thereof;
means on said straight-edge assembly and on said base members cooperable to permit selective movement of said assembly across said drawing surface between the said front and rear edges thereof, said means including an extensible multi-segment rotatable shaft carried by said assembly and having wheel elements at the opposed ends thereof and track elements carried by said base members adapted to receive said wheel elements and to cooperate therewith for selective movement of said assembly.

4,047,305
LINK MECHANISM OF A MECHANICAL TRANSDUCER, ESPECIALLY OF A TOOTHED AMPLIFYING GAUGE

Eugeniusz Ratajczyk; Januariusz Gościmski, and Adam Jędrzejewski, all of Warsaw, Poland, assignors to Politechnika Warszawska, Warsaw, Poland

Filed Apr. 2, 1976, Ser. No. 673,104
Claims priority, application Poland, Apr. 8, 1975, 179417
Int. Cl.[2] G01B 3/22, 5/00
U.S. Cl. 33—172 R 4 Claims



1. A link mechanism of a mechanical transducer, especially of a toothed amplifying gage, comprising an input member (2) performing a rectilinear motion and contacting in a point one arm of a double-arm lever (4), the other arm whereof contacts in a point an output lever (9), and a transmission compensator (7) in the form of an intermediate member, namely a shaft (6) rigidly mounted on a rotating arm (10) of said compensator and arranged between respective working surfaces (5, 8) of said double-arm lever and of said output lever.

4,047,306
BORE HOLE PROBE

Hubert Josef Otte, 165 Evelyn Avenue, and Gosta Roosman, 98 Merrick Street, both of Toronto, Canada

Filed June 4, 1976, Ser. No. 693,110
Int. Cl.[2] E21B 47/022
U.S. Cl. 33—314 12 Claims

1. A bore hole probe for determining the path of a bore hole and comprising
a source of radiant energy
support means for said source of radiant energy;
radiant energy sensitive means, sensitive to exposure to said radiant energy; fibre optic thread means for forming said radiant energy into a narrow spot adapted for transmitting said radiant energy, with said source of radiant energy at one end, the other end of said fibre optic thread means being adjacent to said radiant energy sensitive means, and said radiant energy sensitive means defining a predetermined area having length and breadth, upon a portion of which said spot of radiant energy may be received, and recorded, while the remainder of said area of said sensitive means remains unaffected thereby, whereby to record the position of said spot of radiant energy on said predetermined area of sensitive material;
support means for said radiant energy sensitive means;
flexible connection means extending between said radiant energy source support means and said support means for said sensitive means, permitting relative angular movement between said spot of radiant energy and said radiant energy sensitive means and, rigid support means surrounding said fibre optic thread means within said flexible connection means.

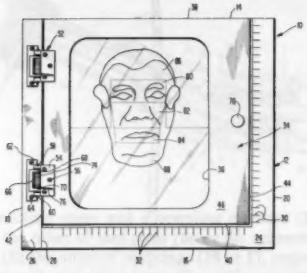
4,047,307
SNAP ACTION FRAME FOR FACIAL IDENTIFICATION SYSTEM

William T. Quinn, III, 681 Park Ave., Freehold, N.J. 07728

Filed May 27, 1976, Ser. No. 690,812
Int. Cl.[2] G09B 1/30
U.S. Cl. 35—28 1 Claim

1. In a facial identification system comprising a composite of facial features interrelated to form a representation of a subject, the composite being made up from changeable individual feature component segments, a holder for said segments comprises:
a base member having top and bottom edges, side edges, and a lower surface;
an elevated ledge along one of said side edges, the ledge extending inwardly;

the base member having an upper surface opposite said lower surface;
first indicia on the upper surface adjacent the side edge remote from the elevated ledge;
second indicia on the upper surface adjacent the bottom edge;
the first and second indicia cooperatively providing coordinates for definition of the location of characteristics on said representation;
a transparent cover plate having upper and lower edges and first and second side edges;
the cover plate having top and inside surfaces;
the first side edge of the cover plate being located adjacent the elevated ledge, and the second side edge being spaced inwardly from the side edge of the base member having said first indicia whereby said indicia are exposed;



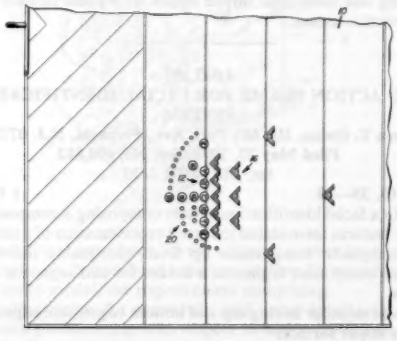
the upper edge of the cover plate being vertically aligned with the top edge of the base member, and the lower edge of the cover plate being spaced inwardly from the bottom edge of the base member whereby the second indicia are exposed; and
snap hinges on the ledge and cover plate to effect flush fitting relationship between the cover plate and base member and to clamp said representations firmly therebetween, said hinges each comprising a hinge plate on the cover plate having sleeves extended therefrom over the elevated ledge, hinge bases on the ledge with a bracket, hinge pins extending through the brackets and sleeves, and springs within the brackets and about the pins and having spring arms extended over the hinge plates.

4,047,308

COACHES FIELD ANALYSIS KIT

Anthony A. Wheeler, 18784 Bainbury St., Canyon Country, Calif. 91351

Filed Mar. 4, 1976, Ser. No. 664,005
Int. Cl.² A63B *71/02*
U.S. Cl. 35—29 R **1 Claim**



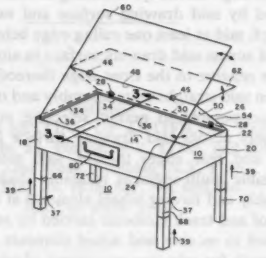
1. A kit for use by a coach on a regulation playing surface in position and play analysis for teaching players positions and plays, the kit comprising a plurality of two different elements forming a first set of elements and a second set of elements, the first set representing an offensive unit and the second set representing a defensive unit, with the elements of the second set each including a body member in the shape of a V and forming direction arrows arrangeable indicating on the playing surface directions of players, with the elements of the first set representing an offensive football unit and being circular disks provided with indicia including raised letters denoting a specific offensive football position and raised designs indicating the direction the player is headed, and the elements of the second set additionally each having a portion of V-shape formed in raised relation on the body member and arranged in conformity with the shape of the body member.

4,047,309

INFORMATION DEMONSTRATION DEVICE

Patricia Diane Royko, 14 Allen Drive, Wayne, N.J. 07470

Filed Nov. 3, 1975, Ser. No. 628,246
Int. Cl.² A47B *97/08*
U.S. Cl. 35—60 **12 Claims**



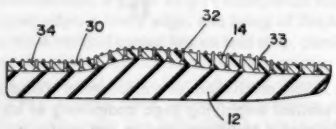
1. A portable device for demonstrating information, comprising:
a. a receptacle structure comprising a bottom and side walls;
b. a lid element pivotably mounted at a first edge, thereof on a first side wall of said receptacle structure;
c. a support element pivotably mounted at an edge thereof on an opposite second edge of said lid element;
d. said receptacle structure comprising means for engaging a second opposite edge portion of said support element;
e. plural retractable legs attached to said receptacle structure; and at least one leaf element pivotably disposed at an edge portion thereof at said second edge of said lid element.

4,047,310

FATIGUE RELIEVING FOOT APPLIANCE

Hyeng P. Sunoo, 20 Greenwood Way, Monterey, Calif. 93940

Filed Apr. 19, 1976, Ser. No. 677,946
Int. Cl.² A43B *3/12*
U.S. Cl. 36—11.5 **10 Claims**



1. A podiatric sandal for relieving foot fatigue comprising:
an outer sole;
an inner sole of resilient material supported by the outer sole substantially conforming to the contour of the plantar surface of the foot except for being mildly elevated in

selected massaging areas defined by the area under the metatarsal arch and between the second and fourth metatarsal;

a plurality of rigid, rounded-head protuberances substantially uniformly distributed in said massaging areas in staggered columns extending above said inner sole for encountering said plantar surface; and

at least one strap bonded to said outer sole for mounting on the foot.

4,047,311

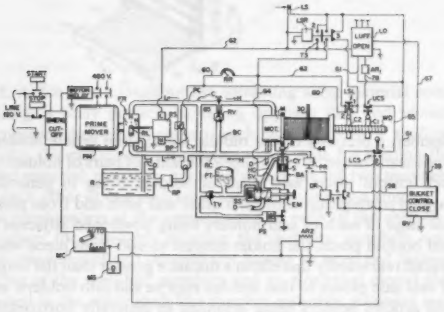
AUTOMATIC GRAB BUCKET WITH PRESSURE RESPONSIVE SOLENOID CONTROL

Charles S. Kelley, 253 Bradwell Road, Barrington, Ill. 60010

Continuation-in-part of Ser. No. 508,274, Sept. 23, 1974, Pat. No. 3,967,394. This application May 20, 1976, Ser. No. 688,232

Int. Cl.² E02F *5/00*; F16D *31/02*; B66D *1/48*

U.S. Cl. 37—54 **11 Claims**



1. In a grab crane having a power driven hydraulic positive displacement pump and a hoist means driven by a hydraulic positive displacement motor for raising and lowering the grab of the grab crane;

conduit means including parallel high pressure conduit and low pressure conduit interconnecting said pump and motor in series flow relationship;

means for detecting a change of grab weight on the hoist means when the lowering grab contacts submerged work material including pressure responsive means critically responsive to a substantial increase of hydraulic pressure in the low pressure conduit from that pressure that is induced therein by the effective weight thereon of the grab being lowered empty under gravity through water at a controlled rate;

means actuated by said increase in hydraulic pressure for closing said grab in timed relation to said change in hydraulic pressure; and

means actuated by said detecting means for changing the pattern of hydraulic flow in the conduits between the motor and pump.

4,047,312

CORNER TOOTH ASSEMBLY

Visvaldis A. Stepe, Willow Springs, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 8, 1976, Ser. No. 721,654

Int. Cl.² E02F *9/28*

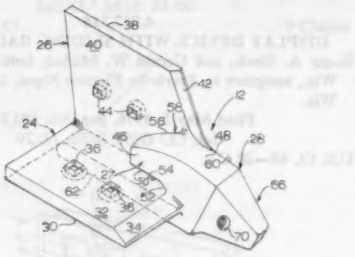
U.S. Cl. 37—141 R **7 Claims**

1. A corner tooth assembly, adapted to be removably secured to the corner of an implement having a floor member and side wall member substantially normal thereto, comprising:

a bottom wear plate disposable exteriorly of said floor member and having a forwardly extending cutting edge thereon;

a side wear plate disposable exteriorly of said side wall member and having a forwardly extending cutting edge thereon;

a body portion of substantial cross section integrally associated with a front portion of said bottom plate and said side plate;



an earth penetrating member which extends forwardly from said body portion; and

a hook member extending rearwardly from said body portion and being of a construction sufficient for interlocking said floor member and said side wall member immediately inwardly the intersection thereof.

4,047,313

CONVERTIBLE GRAB BUCKET

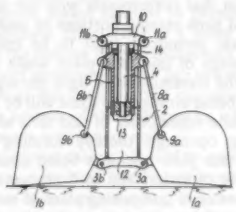
Jean-Pierre Luc Bricon, Venissieux, France, assignor to International Harvester Company, Chicago, Ill.

Filed Feb. 9, 1976, Ser. No. 656,237

Claims priority, application France, Feb. 10, 1975, 75.04573

Int. Cl.² E02F *3/44*; B66C *3/00*

U.S. Cl. 37—187 **1 Claim**



1. A hydraulic implement capable of being connected for operation in one of a digging mode and a rehandling mode comprising:

a frame having an upper portion and a lower portion detachably secured to the upper portion;

first and second pivot ears secured to said upper and lower portions respectively;

a piston including a rod affixed to said upper portion;

a cylinder reciprocable upon and sealingly engaging said piston; pivot lugs on the upper end of said cylinder;

said lower portion having open apertures at its upper end through which said pivot lugs extend, said apertures being wider than said cylinder to permit removal of said lower portion upon detachment from said upper portion notwithstanding the presence of said cylinder and pivot lugs;

a pair of mating implement members having inner and outer connections on each member;

link means connected to said outer pivot connections;

said link means and said inner pivot connections being selectively connected to provide one of said digging mode, wherein said link means are pivotally connected to said pivot lugs and said inner pivot connections are pivotally connected to said second pivot ears, and said rehandling mode, wherein said lower portion is removed, said cylin-

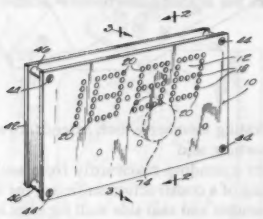
der is inverted on said piston and said link means are pivotally connected to said first pivot ears and said inner pivot connections are pivotally connected to said pivot lugs.

4,047,314

DISPLAY DEVICE WITH SLIDING BACK PLATES

Roger A. Slack, and Gerald W. Michel, both of Milwaukee, Wis., assignors to Everbrite Electric Signs, Inc., Milwaukee, Wis.

Filed May 3, 1976, Ser. No. 682,946
Int. Cl.[2] G09F 9/30, 11/29
U.S. Cl. 40—28 C **6 Claims**



1. A display device comprising an opaque face plate having at least one array of openings therein arranged to represent predetermined indicia when light is transmitted through selected openings of said array, an opaque back plate slidably mounted behind said face plate and having an array of light passages therein, some of which are elongated slots which are of substantially greater length than the corresponding dimension of openings in the face plate, means guiding said back plate for reversible stepped sliding movement in a predetermined lineal direction that corresponds with the direction in which said elongated slots extend, portions of said light passages in said back plate permitting light to be transmitted through selected openings of said face plate while said opaque back plate blocks the transmission of light through other openings and said slots being arranged so some will be between openings in said face plate while other of said slots are coincident with corresponding openings, thereby forming selected indicia, some of said face plate openings being arranged in a line extending in one direction and said elongated slots being arranged in rows each comprising slots of varying length, said rows being parallel to each other and inclined at an acute angle relative to said line, and drive means coupled to said back plate for shifting said back plate linearly, said elongated slots being so disposed relative to said face plate openings that when the back plate is shifted in its guided path there is a change in the selection of openings in the face plate through which light is permitted to pass, thereby changing said indicia.

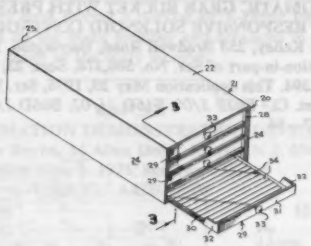
4,047,315

HOLDER FOR PHOTOS AND THE LIKE

Benjamin B. Osher, New York, N.Y., assignor to Kleer-Vu Industries, Inc., New York, N.Y.

Filed Sept. 17, 1976, Ser. No. 724,256
Int. Cl.[2] B42F 7/12
U.S. Cl. 40—102 **3 Claims**

1. Apparatus for holding a plurality of thin articles including photographs in a manner to be selectively displayed comprising, an elongated housing having top and bottom walls connected by generally parallel side walls and a back wall, the front end of said housing being open, a plurality of elongated superimposed stationary guide members mounted in stacked abutting relationship with each other within said housing in a position to reinforce the same, each of said guide members including upper and lower horizontally disposed portions and vertically disposed side portions, said side portions being in abutting relationship with said side walls of said housing, said guide members extending substantially the entire length of said housing, a tray slidably mounted in each of said guide members, each of said trays including a bottom piece substantially complementary to said horizontally disposed portions of said guide members, each of said trays having a front piece extending upwardly from the front edge of said bottom piece and a pair of side pieces extending rearwardly a short distance from said front piece along each side of said bottom piece, said front pieces closing the open end of said housing, means carried by each tray for withdrawing the tray from its associated guide



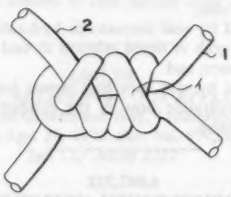
member, a plurality of flat tubular transparent article holders, tape means hingedly mounting a plurality of pairs of holders on said bottom piece, said pairs of holders being in generally parallel relationship with each other and with said front piece, one edge of each of said holders being positioned adjacent to said bottom piece, the holder nearest to said front piece being spaced rearwardly therefrom a distance greater than the length of said side pieces so that articles may be slid into holders, and said articles holders being arranged in generally horizontally disposed overlapping relationship with each other when said trays are in retracted position with said housing.

4,047,316

KNOTTED FISHING NET

Jiro Maruyama, Hakodate, Japan, assignor to Hakodate Seimo Sengu Co., Ltd., Japan

Filed Dec. 22, 1975, Ser. No. 642,759
Claims priority, application Japan, Dec. 27, 1974, 50-518
Int. Cl.[2] A01K 74/00
U.S. Cl. 43—7 **5 Claims**



1. A knotted fishing net wherein the knot is formed of a U-shaped weft, and a warp wound about the weft and drawn out of the knot after passing inside of said shaped weft with the feed and return portions of the warp being wound in opposite directions around said shaped weft in a direction away from the free ends of said shaped weft such that said feed and return portions intersect each other on at least three points and the under-pass and over-pass of the feed portion of the warp relative to the return portion thereof are reversed at two adjacent intersections exclusive of the outermost intersection on the outlet side of the knot on which the warp is drawn outward.

4,047,317

FISH LURE

William H. Pfister, Livingston, N.J., assignor to William R. Pfister, Point Pleasant, N.J.

Filed Feb. 17, 1976, Ser. No. 658,696
Int. Cl.[2] A01K 97/04
U.S. Cl. 43—42.06 4 Claims

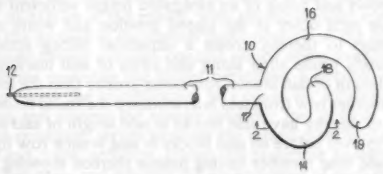
1. A fish lure containing fish attracting scent material comprising: a body portion including opposed first and second elongated shell-like members each formed with a shallow cavity, the said cavities forming an enclosure for holding the scent material; means for swingably securing the two members to each other at one end; latch means comprising a ring and a slot combination at the opposite end of each of the shell-like members for releasably securing the shell-like members, said slot consisting of an L-shaped slot having an open end formed in one of the shell-like members and an elongated closed slot formed in the other shell-like member movably retaining said ring member therein for cooperation with said L-shaped slot to lock the two lower ends of the members together, and the ring is oval shaped, and a fish hook secured at one end to the ring.

4,047,318

ATTRACTOR ELEMENT FOR FISHING LURE

Alan L. Mapp, 676-A Third St., Maxwell AFB, Montgomery, Ala. 36113

Filed Oct. 18, 1976, Ser. No. 733,204
Int. Cl.[2] A01K 85/00
U.S. Cl. 43—42.24 10 Claims



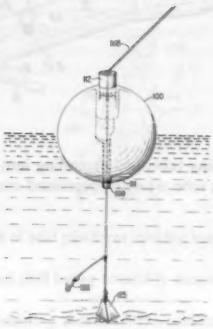
1. An attractor elemeat for a fishing lure comprising:
a. a first pliable leg section,
b. a second pliable leg section,
c. means connecting the forward ends of said first and second leg sections to a fishing lure,
d. said first leg section extending outwardly and rearwardly from its forward end and then inwardly and terminating in a free end rearwardly of its forward end, and
e. said second leg section extending outwardly and rearwardly from its forward end and away from said first leg section and then inwardly around said free end of said first leg section with said second leg section being longer than said first leg section and terminating in a free end rearwardly of said first leg section.

4,047,319

FISHING DEVICE

William Palmer Duncan, Jersey City, N.J., assignor to Van Buren Cunningham, II, Harker Heights, Tex., a part interest

Filed July 12, 1976, Ser. No. 704,526
Int. Cl.[2] A01K 93/00
U.S. Cl. 43—44.87 7 Claims



1. In a fishing device for locating the depth of a body of water and for permitting at least one fish hook affixed to a fishing line to be set at any desired height relative to the bed of said body of water, the improvement which comprises:
a. a float; and
b. a tubular assembly carried by said float, said assembly including:
1. a passageway extending throughout the length of the assembly adapted to permit insertion of the line at a top of the passageway and emergence of the line at a bottom of the passageway; and
2. a first frictional means adapted to permit a first frictional engagement of said line at a point intermediate the top and the bottom of the passageway, in a manner so as to restrict movement of the line towards the top of the passageway, but not to restrict movement of the line towards the bottom of the passageway when said first frictional means is engaged; and
3. a second frictional means adapted to permit a second frictional engagement of said line at a point proximate to the bottom of said passageway, in a manner so as to restrict all movement of the line when said second frictional means is engaged; and
4. disengagement means for disengaging the first and second frictional means, such that when the disengagement means has been actuated, said line is capable of being moved freely toward the top or the bottom of the passageway and when said disengagement means has not been actuated, said first frictional means is engaged alone, or in combination with engagement of said second frictional means.

4,047,320

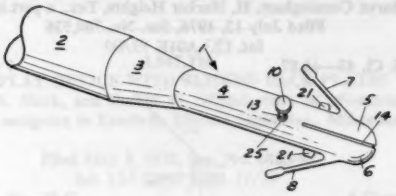
BAIT DISPENSER

Marion D. Lee, Rte. 1, Box 174, Castor, La. 71016

Filed Sept. 23, 1976, Ser. No. 725,849
Int. Cl.[2] A01K 97/04
U.S. Cl. 43—55 10 Claims

1. A bait dispenser comprising:
a. a dispensing tube, one end of which may be fitted to a container carrying live bait, and the opposite end of which is closed and which is characterized by a longitudinal slot defining a pair of jaws;
b. lever means in cooperation with each of said jaws for manipulating said jaws and selectively expanding and contracting said slot; and

c. a plunger positioned adjacent said slot transverse to the longitudinal axis of said dispensing tube, slidably carried



by said dispensing tube, and extending into the interior of said dispensing tube when in depressed configuration.

4,047,321

ANIMAL TRAP

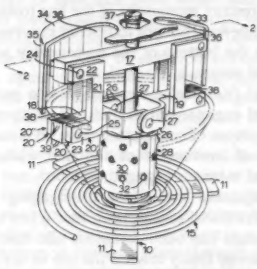
Lloyd Carl Thorning, 115 Coleman Avenue, Toronto, Ontario, Canada (M4C 1P9)

Continuation of Ser. No. 658,738, Feb. 17, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 741,985

Claims priority, application United Kingdom, Mar. 13, 1975, 10588/75

Int. Cl.[2] A01M *23/30*

U.S. Cl. 43—78 **21 Claims**



1. An animal trap comprising a spiral spring having a fixed inner end portion and a movable outer end portion the spring having a plurality of coils and being extendible to a stressed condition thereof, a movable bait holder which is so mounted as to be within the coils of the spring when the spring is in said stressed condition thereof, a support with which said outer end portion of the spring is engageable when in said stressed condition thereof to retain the spring in said stressed condition thereof, and a linkage mechanism through which the bait holder is engageable with the support, the linkage mechanism being operable, by movement of the bait holder under the influence of an animal attempting to remove bait from the bait holder, to move the support for release of said outer end portion of the spring therefrom with resultant retraction of the spring from its stressed condition during which adjacent coils of the spring between which the neck of the animal is disposed exert a shearing action on the neck of the animal to kill the animal.

4,047,322

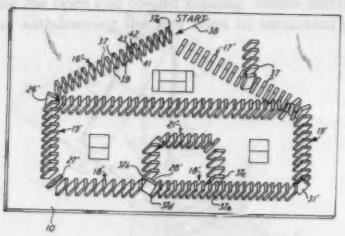
AMUSEMENT DEVICE OF PICTORIAL DISPLAY

Nelson Woodrow Keisling, Racine, Wis., assignor to James Stephen Holub and Robert James LaSalle, both of Racine, Wis., part interest to each

Filed Feb. 17, 1976, Ser. No. 658,176

Int. Cl.[2] A63H *33/00*

U.S. Cl. 46—1 R **2 Claims**



1. An amusement device of pictorial display, comprising a base member having markings thereon depicting an object, said markings being located on said member in rows representing the configuration of said object, said markings being spaced apart relative to each other in directions relative to the length of said rows of said markings, said markings having length and width dimensions and being oriented relative to said rows to have the length dimension disposed transverse to the length of its said row, said markings being located in said rows which intersect with each other, one of said markings at the intersection of said rows having an orientation with its said length dimension which bisects the intersection of the lengths of said intersecting rows, one of said intersecting rows of said markings being arranged as a branch which extends from said intersection with another of said intersecting rows and which re-intersects said another row at a location spaced along said another row, a plurality of elongated blocks disposed spaced apart and on end and singularly on each of said markings with the longest dimension of said blocks being upright and with said blocks being presented along said rows of and at the orientations of said markings, said blocks have a rectangular base having length and width dimensions matching said dimensions of said markings and with the said length dimension of said blocks being orientated with said length dimension of said markings to have said base of said blocks disposed transverse to said rows, said blocks being tipable in the direction along their said rows and being of an elongated height sufficient to lean against each other in the tipped position and while on said markings to thereby create a sequential falling action and ultimately prone align along said rows of said markings, the total length of said branch row being greater than the length of said another row from said intersection o the stated re-intersection, to thereby have said blocks in said length of said another row tip over before all said blocks in said branch row tip over, and said base member having indicia thereon showing which one of said blocks is to be first tipped toward the others.

4,047,323

FLYING OBJECT

Egidio Biffi, 20062 Cassano d'Adda, Via Q. Divona, 29, Milan, Italy

Filed Mar. 31, 1976, Ser. No. 672,451

Claims priority, application Italy, July 3, 1975, 25061/75

Int. Cl.[2] A63H *27/04*

U.S. Cl. 46—47 **6 Claims**

1. A flying object assembly comprising, in combination, a cable, means for connecting one end of said cable to the flying object, a drive handle for rotating the flying object through said cable, an automatic cable winding means within said handle connected to the other end of said cable for yieldingly urging said cable into a wound condition within said handle,

said cable winding means arranged to respond to the centrifugal force of the flying object acting oppositely to the urging force exerted on said cable by said cable winding means for

unwinding of said cable from said handle to a length proportional to the centrifugal force exerted on said cable by the flying object.

4,047,324

BALLOON AND PARACHUTE TOY

Hans Ulrich Wesenberg, D-8506, Langen-Kirchfembach-37, Germany

Filed Mar. 15, 1976, Ser. No. 666,626
Claims priority, application Germany, Nov. 26, 1975, 2555296
Int. Cl.[2] A63H *33/20*
U.S. Cl. 46—86 R **7 Claims**

1. A balloon and parachute toy comprising: a balloon which can be inflated by air, a missile, such as a rocket aviator, parachutist or the like, and a parachute, the balloon having a mouthpiece the longitudinal axis of which passes through the center of gravity of the missile, with the mouthpiece aperture facing the ground in the normal flight position of the missile, the missile having a trough opening which opens towards the balloon for receiving the folded parachute, a portion of the balloon facing the trough acting as a cover for automatically opening and closing the trough whereby the balloon, in its inflated condition, serves to retain the folded parachute in the recess and, upon deflation, allows the parachute to leave the recess and open, and wherein the dimensioning of parts is such that the force of recoil of the air escaping from the inflated balloon is greater than the force of gravity which acts on the missile and the attached balloon and parachute.

4,047,325

BATON TWIRLING FIGURE

Tomio Yamazaki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed June 18, 1976, Ser. No. 715,242
Claims priority, application Japan, Aug. 27, 1975, 50-118589[U]
Int. Cl.[2] A63H *11/10*
U.S. Cl. 46—106 **8 Claims**

1. The combination of a doll having a torso, arms, legs and a head connected together so as to simulate the human body and a support structure for holding the doll in which the improvement comprises:

said support structure including a wheeled platform, a support member extending from the platform to the torso and mechanical drive means for deriving power from at least one wheel of said platform as said platform is rolled along a surface and for conveying motion derived from such

movement of said platform into the interior of said torso of said doll,

an arm of said doll being rotatably mounted upon said torso and

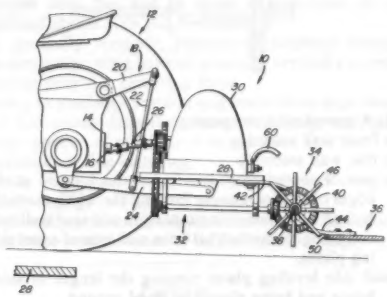
motion transmitting means within said torso for transmitting motion from said mechanical drive means to said arm so as to rotate said arm as said platform is rolled along said surface.

4,047,326

VASCULAR CONTACT ROTATING AND STATIONARY ABRADING ELECTRODE DEVICES FOR ELECTRIC WEED KILLING

Robert C. Tibbs, Cleveland Drive, Cleveland, Miss. 38732

Filed Dec. 5, 1975, Ser. No. 638,097
Int. Cl.[2] A01M *21/00*
U.S. Cl. 47—1.3 **5 Claims**



1. Apparatus for killing undesirable vegetation having stems projecting upwardly from the ground, comprising a mobile frame adapted to be move along the ground, abrading means mounted on the frame for engagement with the stems of said vegetation to remove external layers therefrom, electrode means mounted on the frame for prolonged sequential contact with exposed internal tissues of the vegetation abraded by said abrading means, and electrical supply means connected to the electrode means for conducting current through the abraded vegetation in contact with the electrode means, said abrading means including a rotor, a plurality of blades projecting radially from the rotor and drive means for imparting rotation to the rotor during movement of the frame in a forward direction.

4,047,327

GROUND COVERING MATERIAL

Gunter H. Tesch, Fribourg, Switzerland, assignor to Breveteam S.A., Fribourg, Switzerland

Filed Sept. 24, 1976, Ser. No. 726,228

Claims priority, application Switzerland, Sept. 26, 1975, 12557/75

Int. Cl.² A01G *7/00*

U.S. Cl. 47—9 **5 Claims**

1. A vegetation suppressing, ground covering agronomic mulch sheet comprising a polymeric film having a light-absorbing effective quantity of pigmentation to provide a maximum light transmittance of about 60%; said film being slit in a pattern wherein slits having a length in the range of from about 4 mm to about 12 mm are arranged substantially uniformly in a plurality of rows, and wherein individual slits in a given row are opposite slits of identical dimension in adjacent rows; whereby there are provided a minimum slit density of at least 1,000 slits per square meter and a minimum air permeability of about 200 l/m^2s at a pressure differential of about 10 mm water across the plane of the sheet.

4,047,328

GREENHOUSE

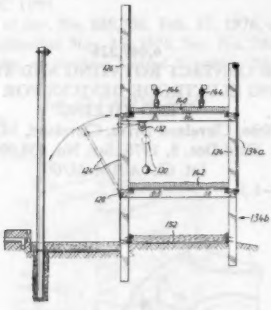
Donald K. Kehl, and Eugene A. Crist, both of Panama City, Fla., assignors to Hygroponics, Inc., Panama City, Fla.

Division of Ser. No. 492,014, July 26, 1974, Pat. No. 3,949,522.

This application Feb. 13, 1976, Ser. No. 657,761

Int. Cl.² A01G *31/00*

U.S. Cl. 47—59 **17 Claims**



1. A greenhouse comprising
a front wall assembly
a rear wall assembly
a pair of spaced-apart leveling plates located at the outer edges of the greenhouse forming the width thereof, and an arched roof connecting said front and rear wall assemblies and being connected between said spaced-apart side leveling plates,
said side leveling plates running the length of said greenhouse and being placed on level ground,
a cover placed over said roof and extending between said side leveling plates,
attachment means connecting said covers to each of said side leveling plates, said cover being placed on said roof,
said roof comprising curved members attached together forming rafters and being secured at their outer ends in the ground at regularly spaced distances along the length of said greenhouse and purlins connected to said rafters extending lengthwise in said greenhouse,
exhaust fan means attached to the front wall of said greenhouse,
an opening provided at the rear wall of said greenhouse, said exhaust fan means operating to draw outside air into said greenhouse from said rear wall end,
baffle louver means connected at the rear wall of said greenhouse, said baffle louver means opening responsive to said exhaust fan means being in operation, said baffle louver means directing air upwardly toward the roof of the greenhouse away from plants in troughs on the greenhouse floor.
counterweight means connected to said baffle louver means,
said baffle louver means comprising door means hingedly connected at its lower end to the rear wall of said greenhouse, the top of said door means connected to said counterweight means, said door means swinging open at its upper end responsive to the operation of said exhaust fan means at said front walls of said greenhouse to direct air upwardly as it enters said greenhouse,
cooling means located outside the rear wall of said greenhouse, said cooling means cooling air prior to its entry into said greenhouse,
said cooling means comprising means for forming a water mist and means for drawing said outside air past said water mist for adiabatically cooling said air,
said cooling means comprising water pads,
means for supporting said water pads in a horizontal position,
means for wetting said water pads,
and means for drawing said outside air through said water pads prior to entry into said greenhouse for cooling said air,
said means for wetting said water pads comprising misting means for creating a mist, said mist being deposited on said water pads, said outside air being drawn past said mist and through said water pads for achieving the cooling of said air prior to its entry into the greenhouse,
said cooling means comprising separated upper and lower water pads, said water pads being horizontally supported with outside air passing therethrough prior to entry into said greenhouse.

4,047,329

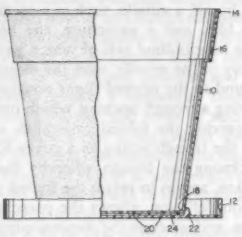
DUAL PURPOSE CONTAINER

William Gilbert Holt, Raynham, Mass., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jan. 2, 1976, Ser. No. 646,131

Int. Cl.² A01G *9/02, 9/04*

U.S. Cl. 47—66 **6 Claims**



1. A dual purpose container comprising:
a container having a double tapered sidewall, the outside of said wall being textured and the inside of said wall being smooth to facilitate material slippage, said container having an open top and a closed bottom, said top having a radially outwardly projecting locking flange, said bottom having a plurality of prethinned portions, said prethinned portions removable to provide aeration to the container, said container having a plurality of concentric feet members providing essentially a full circumference concentric ring, said feet being spaced to provide narrow slot openings directly opposite said prethinned areas of said container bottom, the junctions of said double taper sidewall to each other and to the bottom being rounded with fillets

to provide additional impact strength, to facilitate removal of materials and to prevent material build-up at the junctions; and

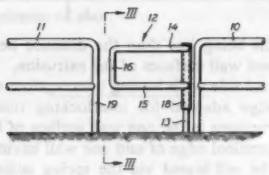
a lid having a skirt portion, the inside of said skirt portion being complementary with the locking flange to seal the top of said container, said lid having a plurality of concentrically spaced lugs on the inside thereof complementary with the periphery of the bottom of said container to provide concentric centering for the bottom of said container and drainage through said prethinned portions and said slot openings when said lid is removed and placed on the bottom of said container as a saucer.

4,047,330

BARRIER FOR MOPEDS AND BICYCLES

Inge Charlen Gustafsson, Skyttevagen 10, S-290 71 Morrum, Sweden

Filed Feb. 18, 1976, Ser. No. 659,054
Int. Cl.² E05D *15/02*
U.S. Cl. 49—42 **4 Claims**



1. A barrier for selectively passing vehicles such as baby carriages of predetermined height or length while barring vehicles such as bicycles of differing height or greater length, comprising, in combination, two substantially U-shaped bows which are arranged substantially horizontally, one above the other, each bow having two legs, and a web fixedly interconnecting the two legs along one side and forming a substantially U-shaped rigid unit therewith, the legs being interconnected at their ends opposite the webs so that the bows are united in one piece; and the distance between the legs of one bow being greater than the distance between the legs of the other bow; a supporting pole mounting substantially U-shaped unit at the webs thereof with the substantially U-shaped unit spaced above the ground; and a second pole spaced from said supporting pole on the open side of said unit and embraced by the legs of the bows; the substantially U-shaped unit and the second pole defining therebetween an open passageway through the barrier, and compelling a vehicle seeking to pass through the passageway to pass on the inside of said second pole between the web and two legs, the distance between the two legs and web and said second pole being so selected as to permit the passage therethrough of vehicles such as baby carriages of a predetermined height or length, while preventing passage therethrough of vehicles such as bicycles of differing height or lesser length.

4,047,331

PET ACCESS DOOR PANEL

George N. Davlantes, 7844 Gazette Ave., Canoga Park, Calif. 91306

Filed Oct. 14, 1975, Ser. No. 622,067
Int. Cl.² E06B *7/28*
U.S. Cl. 49—171 **1 Claim**

1. A pet access door panel for insertion in an opening with a frame having horizontal and vertical apertures in said frame and cooperating with sliding doors in said frame opening, and comprising

spaced vertical stiles;

a weather pane restrained between the stiles;

an intermediate access door rail;

a bottom access door rail;

a top panel rail, each rail extending between the panel stiles;

an access door flap for a pet;

means swingably securing the access door flap to the intermediate rail;

means releasably securing the access door flap to the bottom door rail;

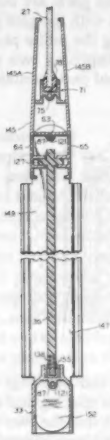
means for adjusting the height of the access door panel;

vertically extending means and vertically spaced horizontal rods fixed in a said stile to protrude therefrom into the horizontal apertures in the said frame for fixing the access door panel in the framed opening;

said access door flap including

lower door edge means moveable to door opening positions on opposite sides of said bottom access door rail;

said means releasably securing said access door flap comprising



generally vertically superposed yieldable, magnetic securing means carried by said lower door edge means of said access door flap and an upper edge portion of said bottom access door rail;

said generally vertically superposed yieldable securing means cooperating to exert generally vertically oriented access door flap centering force,

tending to yieldably position said lower door edge means of said access door flap superposed along said upper edge portion of said bottom access door rail; and

said access door flap including

laterally projecting wiper means operable to compressively engage said spaced, vertical stiles,

said laterally projecting wiper means comprising reduced thickness wed portions of said access door flap.

4,047,332

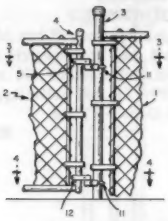
GATE HINGE COMPOSITION

Orient Benoit, Acushnet, Mass., assignor to New Bedford Wire & Iron Company, New Bedford, Mass.

Filed Nov. 20, 1975, Ser. No. 633,687
Int. Cl.² E05D *7/06*
U.S. Cl. 49—236 **1 Claim**

1. Hinge means for mounting the gate to a fence post within an opening in the fence for gravitational closing from an open position, comprising upper and lower supports for attachment to the fence post and upper and lower hangers for attachment to the gate post, said supports and hangers being adjustably movable on the posts for clamping thereto at corresponding spacing, each support comprising an arm, a pintle pin at one end and two-part clamping means at the other end for encircling the fence post so arranged that the axis of the pintle pin

and the axis of the two-part clamping means lie on the longitudinal center line of the arm and are perpendicular thereto, said two-part clamping means comprising at said one end of the arm a transverse part having a substantially half-cylindrical surface which is symmetrical with respect to the center line of the arm, at the opposite ends of which are holes, the axes of which are parallel to the axis of the center line of the arm, a U-shaped band embodying a substantially half-circular part which, in conjunction with the substantially half-cylindrical surface of the transverse part, provides a clamping collar for clamping engagement with the fence post and at its opposite ends straight portions for engagement with said holes and means for securing the straight portions within said holes, said upper hanger comprising two parts of symmetrical configuration adapted to be bolted face-to-face and each part containing longitudinally spaced substantially half-circular openings defining half-circular surfaces of different diameter which collectively define, when the parts are bolted together, a collar for clamping engagement with the gate post and a bearing opening for pivotally receiving the pintle pin of the upper support and said lower hanger comprising two parts adapted to be bolted face-to-face, one of said parts containing longitudinally spaced



substantially half-circular openings defining half-circular surfaces corresponding in spacing and size to those of the parts of the upper hanger such that the two halves of the upper hanger and the one-half of the lower hanger are identical and the other one of the parts of the lower hanger containing a half-circular opening corresponding to said substantially half-circular opening of larger diameter in the one part and a substantially half-circular nub protruding from its face for engagement within the substantially half-circular opening of smaller diameter in the one part, and a limb extending from said other one of the parts at an angle to the center line defined by the faces of the parts beyond and laterally of the center line having at its distal end a bearing opening for pivotally receiving the pintle pin of the lower support so that when the gate is hung, a projection of the axis of the pintle pin of the lower support on a line containing the centers of the posts is closer to the axis of the fence post than is the pintle pin on the upper support and that the center lines of the upper and lower hangers coincide with the vertical plane containing the vertical axes of the posts so that the plane of the gate coincides with the plane of the fence when the gate is closed and, when in said closed position, the axis of the lower pintle pin is situated laterally of said plane.

4,047,333

SNAP-IN KEEPER FOR SLIDING WINDOWS, DOORS AND THE LIKE

Harry M. Riegelman, Fullerton, Calif., assignor to Rusco Industries, Inc., Fullerton, Calif.

Filed Apr. 27, 1976, Ser. No. 680,868
Int. Cl.[2] E05D *13/06*
U.S. Cl. 49—450 **1 Claim**

1. A keeper for a latch means wherein a latch member is carried on a rail or stile of an assembled movable window, door or the like, wherein the latch member is movable relative to an extrusion in which the movable window, door or the like is slidable, and wherein the extrusion has opposed wall surfaces wherein one wall surface has interruptions therein, comprising:

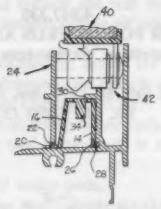
an elongated element adapted to be inserted between the opposed wall surfaces of the extrusion and being a generally U-shaped element having a center wall and two side walls,

said center wall having a number of spaced openings therealong,

each opening being shaped to receive a portion of the latch member,

said side walls being normally non-parallel and characterized by spring action in that they can be forced towards each other and will return to their non-parallel relation when released,

the distance between the terminal edge portions of said



walls being less than the distance between the opposed wall surfaces of the extrusion,

one of said side walls having interruptions along its terminal edge adapted for interlocking relation with the interruptions in the one wall surface of the extrusion,

said terminal edge of said one wall having tabs adapted to be self-biased via the spring action of said side walls to enter crevices or openings in the one wall surface of the extrusion,

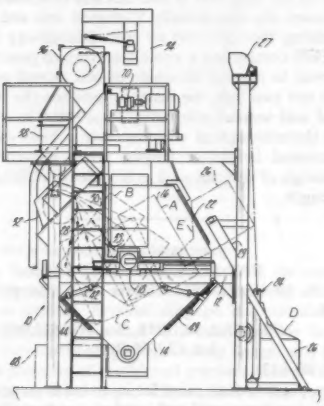
and wherein the extrusion is a sill member and the interruptions in the one wall surface thereof are constituted of weep holes, and wherein the tabs extend through said holes.

4,047,334

BLAST CLEANING MACHINE

Udo Kuehn, Ann Arbor, Mich., assignor to Ervin Industries, Inc., Ann Arbor, Mich.

Filed Nov. 8, 1976, Ser. No. 739,954
Int. Cl.[2] B24C *3/24*
U.S. Cl. 51—422 **4 Claims**



1. In a blast cleaning machine for shot blast cleaning parts, said machine having a main frame, a housing supported in a stationary position on said main frame, a barrel having an open end and a longitudinal axis extending through said end, said barrel being movably mounted in said housing for movement

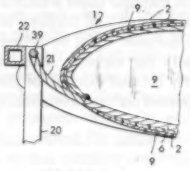
to a part tumbling and blast cleaning position in which said axis extends upwardly toward said open barrel end, means for rotating said barrel about the longitudinal axis thereof, and means in said housing for impelling a stream of shot into the open end of said barrel in said blasting position thereof, said barrel having an annular side wall assembly consisting of a plurality of connected arcuate sections having inner surfaces that cooperate to form the internal side wall surface of said barrel, each of said internal surfaces having leading and trailing portions which are substantially straight and are relatively arranged so as to form an obtuse angle therebetween, said leading portion being ahead of said trailing portion in the direction of rotation of said barrel during rotation thereof to tumble parts therein, said leading portion terminating in a surface portion which extends radially outwardly of said barrel at the leading end of said leading surface portion, said barrel having a bottom surface which is divided into relatively inclined sections, said side wall surface portions, and said bottom surface sections cooperating during rotation of said barrel about the longitudinal axis thereof in said blast cleaning position of said barrel to provide for a tumbling flow of parts in said barrel in a direction substantially diametrically thereof and through said stream of shot.

4,047,335

PNEUMATIC LOAD-SUPPORTING STRUCTURES

Robert M. Darmstadt, 22 G Meadow Green Circle, Englishtown, N.J. 07726

Filed Nov. 18, 1975, Ser. No. 633,074
Int. Cl.[2] E04B *1/345*
U.S. Cl. 52—2 **18 Claims**



1. A pneumatic structure, comprising:

a. an inflatable envelope having opposed, spaced upper and lower membranes;

b. a plurality of vertical diaphragms connected between said first and second membranes, said diaphragms being at least semi-elliptical with top and bottom curved edges that diverge from a common point with respect to the major axis of the ellipse, said diaphragms being reinforced vertically and being operable to resolve the vertical component of forces applied to the top of the envelope;

c. a plurality of upper cables, each upper cable being connected to the top edge of a diaphragm at the junction of the diaphragm and the first membrane;

d. a plurality of lower cables, each lower cable being connected to the bottom edge of a diaphragm at the junction of the diaphragm and the second membrane;

e. said upper and lower cables of each diaphragm being connected to each other near the periphery of said envelope;

f. means for inflating said envelope; and

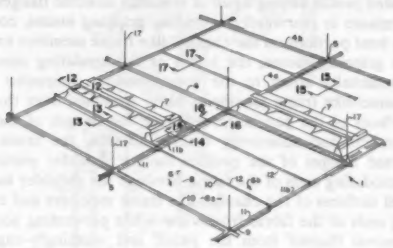
g. said cables and said diaphragms coacting to carry the load applied to the top of the envelope when inflated.

4,047,336

LIGHTING SYSTEM

Leo G. Stahlhut, Kirkwood, and Willard R. Garnett, Bellefontaine Neighbors, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 16, 1975, Ser. No. 622,859
Int. Cl.[2] E04F *19/00*
U.S. Cl. 52—28 **20 Claims**



1. A lighting system comprising:

a first main runner member;

a second main runner member, said first and said second main runner members being identical in at least one cross section, said cross section generally having an inverted U-shape, said inverted U-shape defining an open mouth chamber, said U-shape having a connecting portion, a first leg attached to said connecting portion, a second leg attached to said connecting portion, said legs having a second end and a lip, said lip having a first part extending inboard of the second end of said legs at an angle such that said first part lies in a plane other than a horizontal plane, a second part approximately parallel to said connecting portion, and an upturned third part, the relationship of the first part, the second part and the third part of said lip permitting the attachment of additional structure to said runners both along the lip and along the chamber defined by said inverted U-shape;

a luminaire mounted between said first and second runners; and

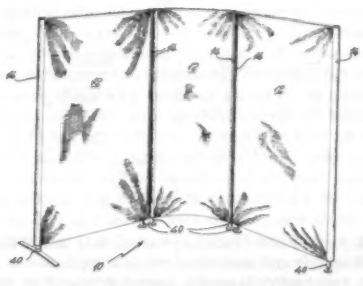
ceiling panel means extending between said first and said second runner members adjacent at least one side of said luminaire.

4,047,337

SOUND INSULATING PANELS

Torsten Bergstrom, Barseback, Sweden, assignor to Formac International AB, Arlov, Sweden

Filed Aug. 18, 1976, Ser. No. 715,522
Claims priority, application Canada, Oct. 30, 1975, 238682
Int. Cl.[2] A47G *5/00*; E04B *1/86*
U.S. Cl. 52—71 **5 Claims**



1. An improved sound insulating panel assembly having a

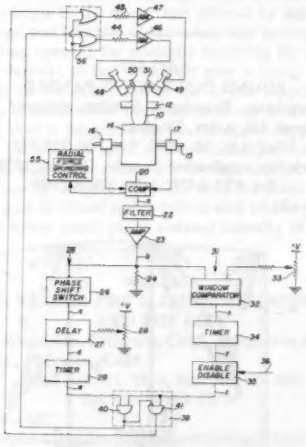
sound insulating core defining a pair of opposed major surfaces extending between a pair of opposite vertical edges, each vertical edge having a channel-like frame member extending along the height thereof, an extruded profile having a semi-cylinderical outer surface releasably supported in each respective channel-like frame member, the semi-cylinderical outer surface having a radius of curvature between 15 and 35 mm, and the profile having a height of at least 800 mm, each extruded profile having a pair of inwardly directed flanges which terminate in rearwardly extending gripping means, cooperating bent portions on the channel-like frame members engaging the gripping means, the width of the insulating core being substantially equal to the corresponding dimension of the channel-like frame members; fabric stretched over th- major surfaces of the panels, forced over the flanges of the frame members and adhesively secured thereto, the inwardly directed flanges of the profiles having shoulder portions accomodating ends of the fabric between the shoulder and adjacent surfaces of the channel-like frame members and concealing ends of the fabric from view while preventing accidental removal thereof from the panel; and meshingly-engagable, connecting-tapes mounted on the respective outer radiused surface of said profiles, said connecting-tapes being releasably-engagable with a complementary connecting-tape on a second structure for assembling the sound insulating panel and said second structure, the two connected tapes at said profile defining a sound-absorbing connection between the panel and said second structure and minimizing sound transmission therebetween, the core being secured to the frame members by fastening means, each pair of complimentary tapes respectively including releasably-engagable mushroom-like sections and meshing portions.

4,047,338

METHOD AND APPARATUS FOR REDUCING LATERAL FORCE VARIATIONS AND OVERTURNING MOMENT VARIATIONS IN PNEUMATIC TIRES

Kenneth J. Gormish, Tallmadge; Clarence Hofelt, Jr., Hudson; Silvano Anthony Lavecchia, Uniontown, and Clarence Arthur Ripley, Jr., Tallmadge, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Filed Dec. 17, 1975, Ser. No. 641,861
Int. Cl.[2] B24B *49/00*
U.S. Cl. 51—106 R **4 Claims**



3. Apparatus for reducing variations in lateral force wherein said sensing and measuring means comprises:

a. two load cells equally spaced from and on opposite sides of the mid-plane of the tire for measuring load forces in the radial direction;

b. converting said force measurements to voltage level signals; and

c. means for subtracting one of said signals from the other to obtain a resulting signal representative of the magnitude and direction of the lateral force variation;

d. means for comparing the lateral force variation with a preset level to determine if said variation is unacceptable;

e. means for determining the point on the tire at which the lateral force variation is at its maximum; and

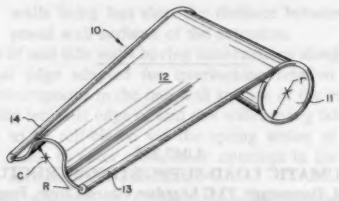
f. means for grinding alternatingly the tread shoulders of the tire if the lateral force variation exceeds said preset level, a zone of one shoulder being ground and the opposite zone of the other shoulder being ground, said zones being chosen in response to said determining means.

4,047,339

HIGH LOAD EXTENDIBLE STRUCTURE

Gordon A. Smith, Gaithersburg, and James M. Talcott, Clarksburg, both of Md., assignors to Fairchild Industries, Inc., Germantown, Md.

Filed Mar. 29, 1973, Ser. No. 345,837
Int. Cl.[2] E04H *12/16*
U.S. Cl. 52—108 **15 Claims**



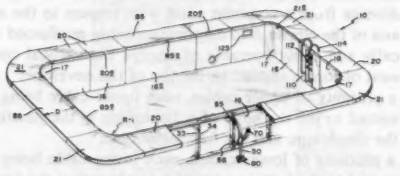
1. A method of forming an elongated thin pre-stressed metallic element comprising placing a flexible non-metallic sheet on a substantially flat metallic sheet which is to be formed into the thin pre-stressed element, and forming at least a portion of the substantially flat metallic sheet by subjecting both the portion of the substantially flat metallic sheet which is to be formed and the adjacently located portion of the flexible non-metallic sheet which is located on the substantially flat metallic sheet to pressure.

4,047,340

SWIMMING POOL MODULAR CONSTRUCTURE

Donald H. Witte, and Donald H. Weir, both of York, Pa., assignors to Fox Pool Corporation, York, Pa.

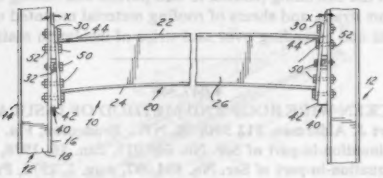
Division of Ser. No. 444,027, Dec. 20, 1974, Pat. No. 3,975,874.
This application Aug. 18, 1976, Ser. No. 715,528
Int. Cl.[2] E04H *3/18*
U.S. Cl. 52—169.7 **18 Claims**



1. A modular swimming pool wall panel being provided at its side extremities with flanges, each of said flanges having formed thereon upper and lower elements for locating continuous panels in a single predetermined vertical relationship, and by said upper and lower elements (with mating means for) interlocking said panel in situ with an adjacent panel to form the pool enclosure, said upper and lower elements providing a

predetermined locking position thereon, respectively, for the upper and lower arms of a supporting brace.

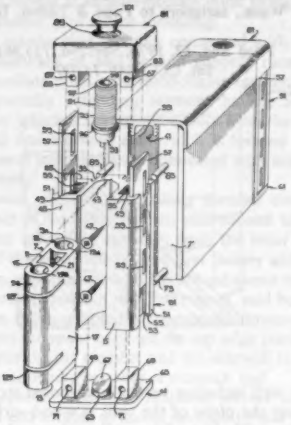
4,047,341
FRAME STRUCTURE
James T. Bernardi, 17200 Fairfield, Detroit, Mich. 48221
Filed Oct. 29, 1976, Ser. No. 737,256
Int. Cl.² E04B 1/18; F16B 9/02; E04C 3/10
U.S. Cl. 52—223 R **9 Claims**



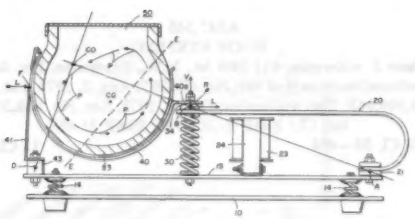
1. A frame structure comprising a pair of spaced apart vertical columns having vertically extending mounting members, the mounting member on one of said columns facing the mounting member on the other of said columns, spacing means forming a fulcrum secured to each of said mounting members at a place thereon spaced from the ends thereof, a horizontal beam extending between the mounting members of said columns, vertically extending end plates fixedly secured to the end portions of said beam, said end plates fixedly secured to the end portions of said beam, said end plates facing said mounting members and being spaced therefrom by and being engageable with said spacing means, moment inducing wedge means interposed in each of the spaces between the corresponding mounting members and end plates, rows of aligned openings in each of said mounting members and end plates which are horizontally and vertically spaced, and fastening means in the form of threaded bolts extending through said aligned openings in said mounting members and end plates and secured thereto by nuts, said fastening means at each end of the beam prior to the tightening of the nuts initially rotating the beam on said spacing means and thereafter after the tightening of the nuts fixedly securing the corresponding end plate of the beam to the opposing mounting member through said wedge means, each of said wedge means being arranged vertically and having an upwardly and outwardly inclined flat surface extending toward the corresponding mounting member and engageable with the opposing end plate of the beam, each wedge means having a vertically extending flat surface engageable with the opposing mounting member of the column, with said inclined flat surface and said vertical flat surface lying in planes which intersect at an acute angle, each wedge means being effective when the threaded bolts and nuts are stressed to induce as a result of the beam rotating on said spacing means an upwardly extending camber in the beam prior to the application of dead loads to the structure, said wedge means being held in the spaces between the corresponding members and end plates solely by the forces generated by said fastening means, without any physical attachment to said fastening means.

4,047,342
PANEL ASSEMBLY
Paul Boulva, 7425 Canora Rd. Ville, Mount-Royal, Quebec, Canada (H3P 2H9)
Filed May 5, 1975, Ser. No. 574,367
Int. Cl.² E04B 2/74
U.S. Cl. 52—239 **25 Claims**

1. A space divider assembly comprising a bridge means joining together a number of structural wall panels each having vertically extending connecting means on vertical edges thereof, along adjacent vertical edges, the bridge means having projecting edges equal in number to the number of panels to be joined together, receiving means at each end of each projecting edge, the receiving means extending longitudinally inwardly of the bridge means from each end and receiving the vertically extending connecting means on the panels.



4,047,343
METHOD OF VIBRATORY POLISHING OF STONES AND THE LIKE
Edward Earl Smith, New London, Iowa, assignor to Geode Industries, Inc., New London, Iowa
Division of Ser. No. 498,070, Aug. 16, 1974, Pat. No. 3,978,623.
This application June 23, 1976, Ser. No. 698,968
Int. Cl.² B24B 1/00
U.S. Cl. 51—313 **3 Claims**



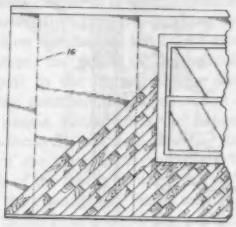
1. In the method of polishing discrete material such as stones and the like by tumbling of the same together with an abrasive medium in a vibrated container having a wall whose inner surface is arcuate relative to a substantially horizontal first axis, the improvement comprising: tumbling a mass of the material and the abrasive medium in a path about a second axis substantially parallel to the first axis and through the body of said mass, said path including a portion along said wall surface, and vibrating the container so that only part of said path portion describes an orbit having its theoretical center on a third axis parallel to the first and second axes and disposed above the center of gravity of said mass, said part of said path portion being more remote from said third axis than any other portion of said path, whereby increased alternate compaction and separation of the material in the abrasive is achieved during the tumbling process.

4,047,344

WOOD VENEER WALL COVERING

John R. Postman, Portland, Oreg., and Elwin G. Bottorff, Kalama, Wash., assignors to Pope & Talbot, Inc., Portland, Oreg.

Filed Aug. 12, 1976, Ser. No. 713,861
Int. Cl.[2] E04F *13/00*
U.S. Cl. 52—390 10 Claims



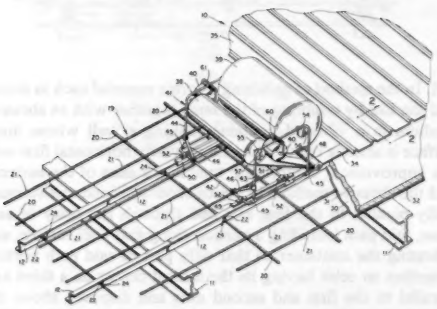
5. For a wall including vertically disposed structural members forming the plane of the wall, a wood surface covering forming the visible face of the wall, said covering comprising wood veneer strips having a width corresponding to lumber width and a thickness no greater than about the thickness of the annual growth in the wood of the strip, the relatively thin nature of the strip accommodating manual bending of the strip to accommodate surface curvature and irregularities in the plane of the wall,

said strips being disposed with one set of faces lying against and adhesively bounded to the wall, said strips occupying side-by-side nonoverlapping rows extending diagonally on the wall with each row containing strips extending longitudinally thereof, said strips being disposed end-to-end in a row and the ends of strips in one row being staggered with respect to the ends of strips in other rows, said wall having bounding margins along the top and bottom of the wall and a row of strips where such terminates at a bounding margin including an end strip which has a cut extending diagonally thereof which appears as a horizontal cut with the strip on the wall with such cut coinciding with the bounding margin.

4,047,345

ROOF SYSTEM

Robert J. Alderman, 812 59th St., N.W., Bradenton, Fla. 33505
Continuation-in-part of Ser. No. 494,097, Aug. 2, 1974, Pat. No. 3,969,863. This application Dec. 8, 1975, Ser. No. 638,329
Int. Cl.[2] E04B *2/28, 2/60;* E04F *21/00*
U.S. Cl. 52—404 12 Claims

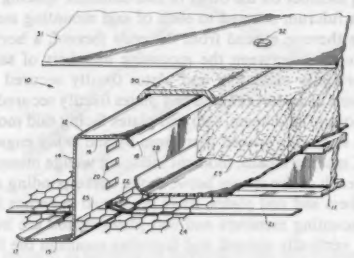


1. In a roof structure comprising a plurality of spaced rafters oriented parallel to one another, a plurality of purlins each including an upwardly extending central web, said purlins being mounted in spaced parallel relationship with respect to one another on said rafters, the improvement therein of the upwardly extending central webs of said purlins defining a plurality of openings at various heights therein with the openings of the purlins being in approximate alignment with the openings of the purlins or opposite sides thereof, and a plurality of insulation support straps oriented parallel to one another and perpendicular to said purlines and extending through aligned ones of said openings of said purlins, elongated strips of insulation material of a width approximately equal to the spacing between the central webs of said purlins positioned between the extending parallel to said purlins and resting on said support straps, and sheets of roofing material mounted on said purlins and extending over said strips of insulation material.

4,047,346

CHICKEN WIRE ROOF AND METHOD OF INSULATION

Robert J. Alderman, 812 59th St. NW., Bradenton, Fla. 33505
Continuation-in-part of Ser. No. 649,911, Jan. 16, 1976, and a continuation-in-part of Ser. No. 494,097, Aug. 2, 1974, Pat. No. 3,969,863. This application Feb. 9, 1976, Ser. No. 656,642
Int. Cl.[2] E04B *2/28;* E04D *3/35*
U.S. Cl. 52—407 12 Claims



1. In a roof structure comprising a plurality of approximately equally spaced purlins oriented parallel to one another in a common plane, each of said purlins including an upwardly extending central web and oppositely laterally extending upper and lower flanges, the improvement therein of each of said purlins defining groups of openings through its central web, said groups of openings being spaced along the length of the purlins with the openings of each group being variably spaced from the flanges of the purlins and with the openings of the purlins being in approximate alignment with the openings of the purlins on opposite sides thereof, a plurality of support straps oriented parallel to one another and extending through the openings of the central webs of said purlins, elongated strips of wire mesh positioned between and extending parallel to said purlins and resting on said support straps and spanning the space between the central webs of adjacent ones of the purlins, elongated sheets of substantially impervious material positioned between and extending parallel to said purlins and resting on said sheets of wire mesh and spanning the space between the central webs of adjacent ones of the purlins, a layer of heat insulation material extending over each sheet of material, and sheets of roofing material mounted on said purlins.

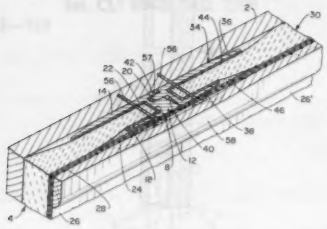
4,047,347

WALL OR CEILING PANEL CONSTRUCTION

Lloyd J. Scheid, 4404 Grimes Place, Encino, Calif. 91316
Continuation-in-part of Ser. No. 510,027, Sept. 27, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,821
Int. Cl.[2] E04B *2/00;* E04C *2/00*
U.S. Cl. 52—436 51 Claims

1. A panel construction comprising the combination: a first elongate panel of gypsum core construction material having first and second opposed lateral edges; a female elongate

mounting member secured substantially coextensively along one of said first and second opposed lateral edges, said female elongate mounting member comprising a channel-like configuration with solid, continuous wall first and second opposed flanges and an integral, intermediate connecting web portion; said web portion having an intermediate groove, the confronting surfaces of said first and second flanges having a plurality of grooves therein and matingly engaging opposed surfaces of said first elongate panel in an edge reinforcing manner; a male elongate mounting member secured substantially and coextensively along the other of said first and second opposed lateral



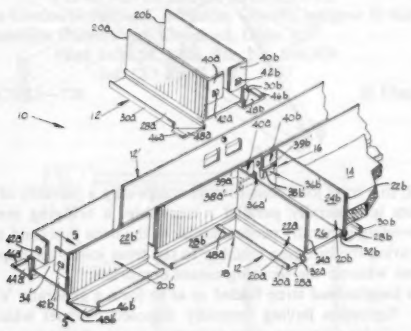
edges, said male elongate mounting member comprising a channel-like configuration with solid, continuous wall first and second opposed flanges and an integral, connecting web portion having an intermediate tongue adapted to matingly nest within the groove of said female mounting member of a secondly positioned elongate panel, the confronting surfaces of said opposed flanges of said male mounting members having a plurality of grooves therein and matingly engaging opposed surfaces of said first elongate panel in an edge reinforcing manner, said male and female elongate mounting members being adapted for rigid securement to a support surface.

4,047,348

CEILING SUPPORT GRID SYSTEM

Diarmuid Justin McSweeney, Granville, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.

Filed June 28, 1976, Ser. No. 700,289
Int. Cl.[2] E04B 5/52; E04C 2/42
U.S. Cl. 52—484 **11 Claims**



1. A ceiling support arrangement, comprising:

a. a plurality of longitudinally extending support runners, each of which includes

i. a pair of horizontally spaced apart and aligned vertical sidewalls having respective outer surfaces and confronting inner surfaces,

ii. means joining said sidewalls together, said joining means extending between the inner surfaces of the sidewalls adjacent the bottom edges thereof, and

iii. a pair of support flanges respectively connected with the bottom edges of said sidewalls and extending horizontally out from the outer surfaces thereof;

b. means for connecting one end of a first of said runners to a second runner at an intermediate point along the length of said runner, said means including:

i. a first interlocking member connected with one of the said sidewalls of said second support runner at said intermediate point, said interlocking member including an upwardly extending segment having a top edge portion which is spaced outwardly from the outer face of said one sidewall and which is located above the horizontal support flange connected with said one sidewall, and

ii. a second, vertical interlocking member connected to one end of said first runner, said second interlocking member extending inwardly from the inner surface of one of the sidewalls of said first runner and having a bottom edge portion which is spaced above the sidewall connecting means of said first runner, said bottom edge portion being adapted for vertically downward insertion into the space between the top edge portion of said first interlocking member and the sidewall to which the first interlocking member is connect; and

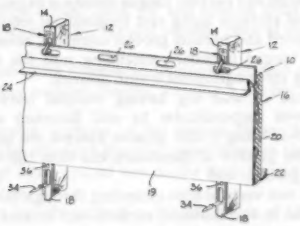
c. means separate from said first and second interlocking members and located at and connected to said one end of said first runner in a horizontal plane including said support flanges of said first runner, said last-mentioned means being interlocked with a support flange of said second runner at said intermediate point for interlocking said end of said first support runner to the second support runner at said intermediate point along the length of said second runner for preventing said first runner from moving away from said second runner in said horizontal plane and for preventing said first runner from rotating in said plane relative to said second runner.

4,047,349

SHEET MATERIAL ATTACHING DEVICE AND WALL ARRANGEMENT USING THIS DEVICE

Manuel Aguilar, Jr., Savannah, Ga., assignor to Johns-Manville Corporation, Denver, Colo.

Filed May 14, 1976, Ser. No. 686,351
Int. Cl.[2] E04D 1/34
U.S. Cl. 52—551 **3 Claims**



1. A device for supporting sheet material to a vertically extending, fixed support member, said device comprising:

a. a longitudinal metal strip having a front longitudinally extending face and a back longitudinally extending face, said strip being adapted for connection with said support member such that said back face rests against said support member; and

b. a plurality of elongated metal support elements spaced from one another longitudinally along the front face of said strip and integrally formed therewith, each of said elements being connected at one end with said strip and extending out beyond the front face thereof, whereby an outwardly extending portion of each of said elements is adapted for insertion through an opening through said sheet material to support said sheet material in a vertical

position adjacent said fixed support member said portions being substantially straight before being inserted through association openings, said elements being constructed of bendable metal whereby, once the outwardly extending portion of said elements are inserted through corresponding openings through said sheet material, said portions can be bent in a vertically upward direction to aid in supporting said sheet material against said fixed support member;

c. each of said support elements including an upwardly extending irregularity located a predetermined distance in front of the front face of said elongated strip, said irregularity being positioned directly behind a corresponding opening is said sheet material when the outwardly extending portion of the support element is inserted through said corresponding opening, said irregularity being adapted to inhibit movement of said sheet material inwardly along said support element beyond said irregularity.

4,047,350

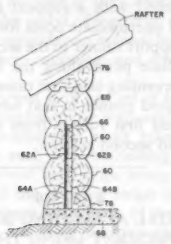
LOG PRODUCT AND IMPROVEMENTS IN MACHINE TO PREPARE LOGS FOR LOG HOUSES

Finis Lavell Chisum, P.O. Box 1145, Claremore, Okla. 74017

Continuation-in-part of Ser. No. 571,373, April 24, 1975, Pat. No. 3,951,187. This application Apr. 19, 1976, Ser. No. 678,238

Int. Cl.² E04C *1/10*; E04B *1/10*

U.S. Cl. 52—593 **1 Claim**



1. A finished log for log house construction comprising

an esentially cylindrical log cut to desired length,

upper and lower parallel flattened surfaces along the longitudinal length of said log,

two spaced and parallel tongue members extending from one of said surfaces along said longitudinal length,

two spaced and parallel groove members, reverse images of said tongue members, extending into the other surface along the longitudinal length thereof,

each end of said log having vertical outward opening grooves perpendicular to said flattened surfaces, said grooves being a first groove nearest the said end and a second groove of dimension less than the width of said first groove, and

at least one vertical hole extending through said log perpendicular to said flattened surfaces and located between said spaced tongue and grooves.

4,047,351

LIGHT TRANSMITTING PANEL

Paul Derner, Gelsenkirchen; Hans Soantag, Gelsenkirchen-Buer, and Otto Stehl, Essen, all of Germany, assignors to BFG Glassgroup, Paris, France

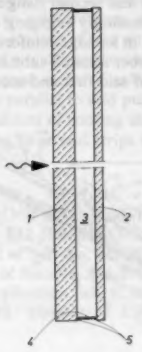
Filed Sept. 16, 1975, Ser. No. 613,852

Claims priority, application Luxembourg, Sept. 16, 1974, 70915; Sept. 16, 1974, 70916; Germany, Dec. 27, 1974, 2461533; Dec. 27, 1974, 2461531; Dec. 27, 1974, 2461532; Feb. 1, 1975, 2504293; Luxembourg, Apr. 4, 1975, 72220

Int. Cl.² B32B *1/04*; E04C *2/34*

U.S. Cl. 52—616 **34 Claims**

1. In a light transmitting panel composed of at least two panes and spacer means holding the panes in spaced relation to define an inter-pane space between adjacent panes, the improvement wherein, for imparting improved sound damping properties to said panel, at least two said panes have respectively different masses per unit light transmitting surface area, said inter-pane space is sealed from the atmosphere, and said



panel comprises a gaseous medium filling said space and having a composition such that the velocity of sound propagation in said gaseous medium is at least 1.2 times the velocity of sound propagation in dry air at the same pressure and temperature.

4,047,352

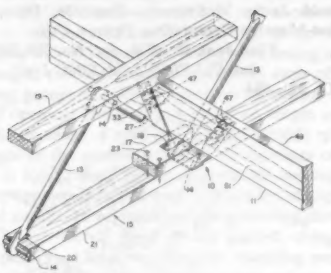
BRIDGING CLIP FOR TRUSS JOISTS

Lavern E. Sweet, 6561 Arthur St., Chino, Calif. 91710

Filed Aug. 16, 1976, Ser. No. 714,560

Int. Cl.² E04C *3/02*

U.S. Cl. 52—693 **3 Claims**



1. In a truss joist construction comprising a plurality of truss joists in generally parallel relationship, a bridging member extending generally perpendicular to the truss joists and means securing the bridging member to the truss joists, the improvement wherein the securing means comprises:

a longitudinal strap folded so as to form a generally V-configuration having centrally disposed channel which includes a bottom strap extending across the bottom of the chord of a truss joist, two adjacent portions of the strap extending perpendicularly to the bottom strap upwardly along the vertical edges of the chord, the vertical portions having oppositely angled fold lines so disposed that the vertical portions are folded outwardly along the respective angled fold lines such that the upper ends of the strap extend upwardly from the bottom strap and diverge outwardly from each other and are displaced so that the ends lie in parallel planes a distance D apart, the distance D approximating the thickness of the bridging member, the ends of the strap being secured to the bridging member

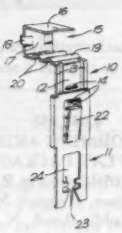
whereby the bridging member is securely fastened above and perpendicularly to the chord for positioning the chord relative to other truss joist chords, transmitting loading between adjacent truss joists, and maintaining bridged truss joists in relatively parallel relationship.

4,047,353

RIDGE CAP HOLDING CLIPS

Raymond Joseph Aarons, Jindallee, Australia, assignor to Monier Colourtile Pty. Ltd., Darra, Australia

Filed May 14, 1976, Ser. No. 686,553
Int. Cl.² E04B *7/02, 7/06*
U.S. Cl. 52—713 **9 Claims**



1. A clip for securing a ridge- or hip-cap of the type having cap-pieces mounted end-to-end to form a continuous capping, said clip including:

an upright lower part having anchoring means for attaching said part to a T-section member of a building structure, said anchoring means being constituted by a slot in said upright lower part having inwardly projecting lugs to define opposed notches positioned for slidably engaging a flange of the T-section member;

an upper part including a depending section for passing between edges of adjacent cap-pieces and a top section to overlie the top surfaces of both said cap-pieces; and

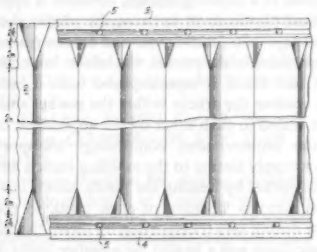
attachment means between said upright lower part and said depending section.

4,047,354

COMPOSITE BEAM STRUCTURE

James Gordon Sutherland, Kingston, Canada, assignor to Alcan Aluminum Corporation, Cleveland, Ohio

Filed June 15, 1976, Ser. No. 696,354
Int. Cl.² E04C *3/32, 3/07*
U.S. Cl. 52—729 **16 Claims**



1. A beam, including:

a. an elongated, relatively flexible, transversely corrugated web (**1,2,6**);

b. two elongated, relatively rigid, structural members, (**3,4,7**), each member having a slot (**3c,4c,7a**) receiving one margin of said web;

c. said corrugated web comprising primary corrugations (**1a,1b**), each having a depth greater than the width of the slot and extending transversely across the middle (**2n**) of the web, said primary corrugations enhancing the stress resistance of the web, and relatively shallow secondary corrugations (**1d,1e,1g,1h**) extending transversely across each margin from the edge of the web to a juncture with the primary corrugations, said shallow corrugations having a depth which increases gradually from a minimum at the edge of the web to a maximum at said juncture, said minimum depth being smaller than the width of the slots, to facilitate movement of the margins into the slots; and

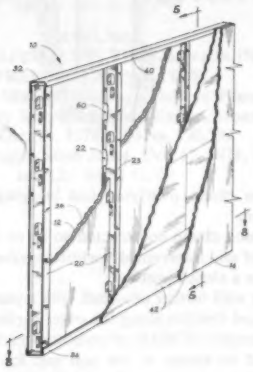
d. means (**5**) fastening each margin of the web in its associated slot, to lock the members and the web together in a unitary beam.

4,047,355

SHAFTWALL

William L. Knorr, Salem, Oreg., assignor to Studco, Inc., Salem, Oreg.

Filed May 3, 1976, Ser. No. 682,330
Int. Cl.² E04C *3/07*
U.S. Cl. 52—738 **15 Claims**



1. In a shaftwall,

a plurality of vertical studs of sheet metal,

each stud having at one side thereof an inner flange and an outer flange folded back on and spaced from the first flange to form a thin, vertical passage open at the top and one side,

the inner and outer flanges being parallel to each other and overlapping portions thereof forming a double thickness flange,

the overlapping portions of the second flange having an opening therethrough into the space between the flanges,

the openings being spaced low on the studs to admit air into the passages,

and gypsum boards secured to the other side of the studs.

4,047,356

POST FOOTING FORM HOLDER AND STABILIZER SYSTEM

Mario Louis DePirro, 511 S. Highland Ave., Lombard, Ill. 60148

Filed Dec. 22, 1975, Ser. No. 642,724
Int. Cl.² E02D *27/00*
U.S. Cl. 52—749 **7 Claims**

1. A post footing form holder and stabilizer system for use in conjunction with a post form and stabilizer means for positioning and retaining the post form in its use position, comprising in combination,

a collar formed by a peripheral side wall and having an open top end and an open bottom end bounded by a bottom edge,

said open bottom end having a flange positioned along the bottom edge and extending inwardly for a distance,

said collar being dimensionally sized to accommodate the positioning of the post form therein and said flange functioning as a bottom stop for the post form once inserted within said collar,

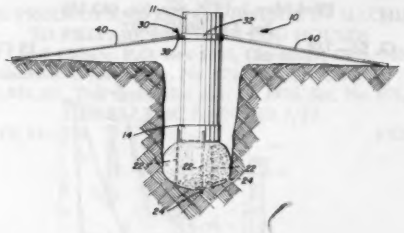
a plurality of legs mounted on said collar and extending downwardly therefrom and terminating in a lower end,

said legs being provided with stop means mounted thereon and spaced a distance upwardly from said lower end of said legs,

stabilizer means associated with said collar and post form for stabilizing and maintaining the post form and collar in position when forming a post footing,

said stabilizer means comprising,

a clamp ring formed by a ring wall having an interrupted portion,



a tension clamp overlying and bridging said interrupted portion,

said tension clamp constructed so as to draw the opposed ends of said interrupted portion together and positionally lock in a closed position,

said ring wall further provided with a plurality of tie means mounted thereon along the outer surface thereof,

and a plurality of stabilizer rods constructed so as to attach to said tie means at one end and for attachment to an underlying support surface at the other end,

whereby said clamp ring may be circumferentially positioned about the post form while the tension clamp is positionally locked such as to firmly retain said clamp ring about the post form, while said stabilizer rods are then attached to said tie means at one end and secured to the underlying support surface at the other end thereby to firmly retain and position the clamp ring, and in turn, the post form in position.

4,047,357

ROOF STRUCTURE OF CONCRETE EDGE-TO-EDGE ABUTTING PANELS AND METHOD OF INTERCONNECTING SAME

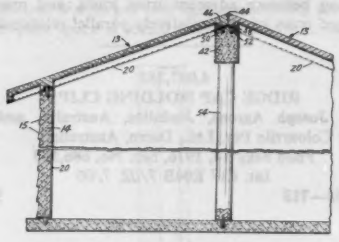
Stanley C. Mulholland, deceased, late of Rochester, Minn., by Wanda E. Mulholland, administratrix, Mr 73, Box 168, Rochester, Minn. 55901

Continuation of Ser. No. 502,345, Sept. 3, 1974, abandoned. This application Feb. 25, 1976, Ser. No. 661,142

Int. Cl.[2] E04B *7/04*

U.S. Cl. 52—90 **7 Claims**

1. A roof structure comprising a plurality of concrete building panels supported, by a supporting means, in abutting edge-to-edge relationship, each said building panel having a downwardly projecting rib extending along each of two opposite side edges on the bottom surface of said panel, each said rib being integral with said bottom surface, a layer of foam covering said bottom surface and extending around each said rib so as to at least partially cover said opposite side edges of said panel, wherein the thickness of each rib is greater at said bottom surface of said panel than at the projecting end of said rib, wherein abutting edges of said panels are received in and supported by a V-shaped notch in said supporting means.



whereby said foam on said abutting edges of said plurality of panels is compressed so as to form a seal.

4,047,358

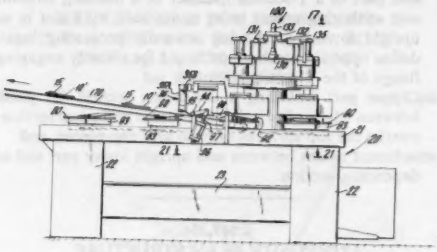
METHOD FOR FORMING ARTICLE-HOLDING DISPLAY PACKAGES

William Heffernan, Westfield; George R. Hair, Clifton, both of N.J., and John G. Nielsen, Freeport, N.Y., assignors to International Inpak Inc., Saddle Brook, N.J.

Continuation of Ser. No. 437,314, Jan. 28, 1974, abandoned, which is a division of Ser. No. 205,817, Dec. 8, 1971, Pat. No. 3,788,032. This application Sept. 7, 1976, Ser. No. 727,002

Int. Cl.[2] B29C *17/04*; B65B *43/08*

U.S. Cl. 53—30 R **2 Claims**



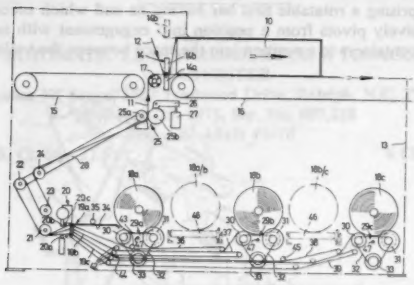
1. In a method for forming and sealing article holding pockets in plastic windows in a series of sheet-like blank members, each member having at least one window opening covered on one surface by a heat formable, heat sealable plastic sheet sealed to said one surface, wherein heat is applied to the plastic sheet and then, at a molding station, pressure is applied to the already heated plastic sheet to cause the plastic sheet to conform to the shape of a female mold and form a pocket, then an article is inserted into the pocket, the said at least one window opening of said blank is superimposed with a further blank member to enclose the article within the pocket and the blank sections are sealed to each other by the application of heat and pressure, the improvement comprising: transporting each blank from a supply station to the molding station and partially forming said packet by heating the plastic sheets covering said at least one window opening of each blank to the molding temperature during said transporting by direct thermal contact of said plastic sheet and a heated die member under differential air pressure, drawing said thus heated plastic sheet through said window opening into a female mold to complete forming of said pocket, transferring said blank to an article insertion station and inserting an article in said pocket, superimposing said blank with a further blank section, sealing said further blank section to said heat sealable plastic sheet by the application of heat and pressure at a sealing station, and wherein a different blank is operated upon at each station.

4,047,359

DEVICE FOR PACKAGING AN OBJECT IN FOIL

Theo Gronebaum, Rietberg, Germany, assignor to Firma Heinrich Kuper, Reitberg, Germany

Filed Sept. 1, 1976, Ser. No. 719,466
Int. Cl.[2] B65B *57/04, 51/14*
U.S. Cl. 53—64 24 Claims



1. Device for packaging an object in foil wherein a pair of foils are disposed on both sides of a packaging plane and, in a central welding device, are welded to one another enclosing therebetween the object to be packaged, and wherein the foil webs travel in a given direction and, for each foil web, a foil-web parting and/or foil-web re-welding device is provided, serving to effect an exchange of foils and having functional members for parting a foil web as well as for welding a pair of juxtaposed foil-web ends together, the functional members extending transversely to the foil-web travel direction, the parting and/or re-welding device being disposed between a bearing which carries one foil roll, and a foil-web pulling device located upstream of the central welding device in the foil-web travel direction, the packaging device comprising at least another bearing carrying a foil roll disposed in spaced relationship to and behind the first-mentioned foil-roll bearing, means defining respective separate foil-web guide paths for the foil webs of each of the foil rolls, said guide path means comprising at least one conveyor device and extending from said foil-roll bearings to the vicinity of said parting and/or re-welding device, said separate guide paths having respective end regions at said vicinity of said parting and/or re-welding device, said end regions being disposed slightly spaced from one another at varying elevations.

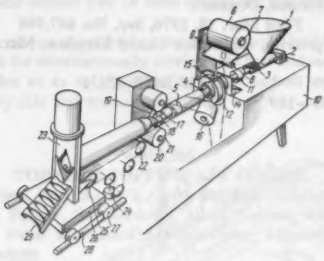
4,047,360

AUTOMATIC MACHINE FOR MAKING PACKAGES OF VISCOUS FOOD PRODUCTS BY ENCLOSING IN A CASING

Alexandr Ivanovich Minaev, Oktyabrskaya ulitsa, 89, kv. 50; Alexandr Valerievich Lebedev, Severny bulvar, 12-B, kv. 252, both of Moscow, and Artur Viktorovich Mogilev, ulitsa Pervomaiskaya, 52-A, kv. 6, Dolgoprudny Moskovskoi oblasti, all of U.S.S.R.

Filed Oct. 20, 1976, Ser. No. 734,048
Int. Cl.[2] B65B *9/06;* A22C *11/08*
U.S. Cl. 53—122 2 Claims

1. An automatic machine for making packages of viscous food products by enclosing in a casing, comprising: a hopper adapted to be charged with a product to be packaged; a positive displacement pump communicating with said hopper; a nozzle communicating with said pump, adapted to feed the product being packaged into a casing; a sleeve mounted about said nozzle and adapted to have formed thereon the longitudinally extending layer of the casing; a mechanism for supplying a flat elastic film web onto said sleeve; a mechanism for supplying another flat elastic film web to be formed into a helically wound layer of the casing, superimposed upon the longitudinally extending layer thereof, said last-mentioned mechanism including a mandrel mounted for rotation, a drive adapted to impart rotation to said mandrel, operatively connected therewith; a spool with a supply of the elastic flat film web to be formed into the helically wound layer of the casing, rigidly



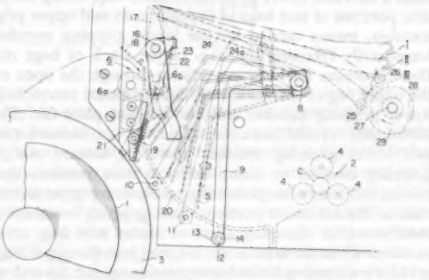
secured on said mandrel at an acute angle thereto; a device for pulling the casing stuffed with the product being packaged off said nozzle, mounted directly on said nozzle.

4,047,361

WRAPPING PAPER SUPPLYING DEVICE IN COIN WRAPPING APPARATUS

Masato Ono, and Minoru Nakamura, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Filed Oct. 18, 1976, Ser. No. 733,192
Claims priority, application Japan, Oct. 17, 1975, 50-125034
Int. Cl.[2] B65B *11/04*
U.S. Cl. 53—212 6 Claims

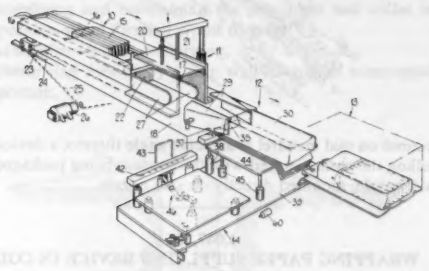


1. A wrapping paper supplying device incorporated in a coin wrapping apparatus wherein a predetermined number of coins are stacked together and wrapped by a piece of wrapping paper fed through a pair of paper feeding rollers and cut by a cutter into said piece of a length adapted for the coins, the paper thus wrapped being thereafter crimped at projecting sides edges thereof at the ends of the coin stack, the paper supplying device comprising: a cutter position setting mechanism for setting the cutter at one of the positions adapted for cutting the paper into said piece of said length appropriate for wrapping the coins of a specific denomination; roller supporting means for supporting one of the feeding rollers in a manner such that one of the rollers is movable toward or away from the other; a cutter position detecting arm which is coupled with said roller supporting means and is displaceable in accordance with the set position of said cutter; and control cam means operating cooperatively with a contact part of said detecting arm for displacing the detecting arm for a period determined by the set position of said cutter, whereby the operative period of the paper feeding rollers is varied depending on the set position of said cutter, and thereby a time-difference appropriate for the wrapping of the coins is provided in the paper feeding operation of the feeding rollers.

4,047,362
PACKAGING MACHINE FOR INSERTING ARTICLES INTO BAGS

Edward Alan Lister, Burnley, and Graham Wilson Clarke, Nelson, both of England, assignors to Brdr. Schur International A. S., Horsens, Denmark

Filed Mar. 18, 1976, Ser. No. 667,944
Claims priority, application United Kingdom, Mar. 20, 1975, 11594/75
Int. Cl.² B65B 43/36
U.S. Cl. 53—189 20 Claims



1. A packaging machine for inserting semi-compressible articles into preformed bags of the kind having one side thereof extended at the open end of the bag so as to define a main portion and an extension portion, the machine comprising a plate for supporting a stack of said bags substantially beneath their main portions, a stationary upper gripping member for engaging the upper surfaces of said extension portion of said bags, a movable lower gripping member supporting the extension portions of said bags in opposition to said upper gripping member, means carried by the lower gripping member for temporarily retaining the bags of the stack of bags relative thereto; means for inserting articles through the open end of the upper bag of the stack; and, linkage means connecting said lower gripping member and said support plate for effecting differential vertical movement therebetween; means for raising said lower gripping member upwardly toward said upper gripping member to clamp said extension portions therebetween; and means for permitting said lower gripper member to release the extension portions, said gripping members being maintained in clamping pressure about said bag extension portions while the articles are inserted into the upper bag, said articles undergoing limited compression against the end wall of the bag after which the clamping pressure is released by movement of said lower gripping member, permitting the filled bag to move relative to the upper and lower gripping members under the influence of said article inserting means, the force applied to the bag being sufficient to overcome the restraint imposed by the temporary retaining means.

4,047,363
PACKAGING APPARATUS

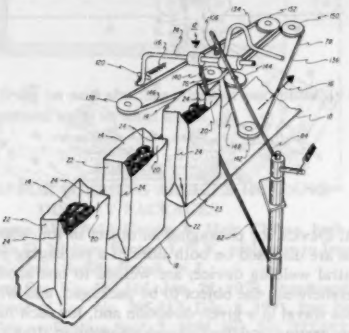
Alfonso Vigneri, Batavia, N.Y., assignor to Richard Rath Packaging Machinery, Inc., Fairport, N.Y.

Filed Nov. 5, 1976, Ser. No. 739,384
Int. Cl.² B65B 7/06, 7/18
U.S. Cl. 53—371 10 Claims

1. For use in closing open ends of containers while they move along a path of travel with the trailing and leading sides of successive containers spaced from each other, apparatus which comprises

a finger disposed adjacent to said path of travel and rotatably mounted to oscillate along an arc between a first location between said trailing and leading sides of said successive containers and a second location spaced from an open end thereof, and

means responsive to the movement of each of said successive containers along said path of travel and actuated by said containers as said containers move along said path past the vicinity of said finger for causing said finger to oscillate from said first location to said second location and then from said second location to said first location so as to form inward folds in the leading and trailing sides of each of said containers at the open end thereof, said actuation by said containers being provided by a mechanism comprising a rotatable first bar having an end which successively pivots from a position into engagement with said containers to a position into the space between the trailing

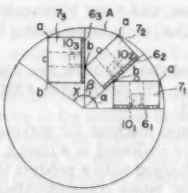


and leading sides of successive ones of said containers, a second bar rotatable with said first arm, a cam member disposed in engagement with said second bar, said cam member and said finger being rotatably mounted for conjoint movement, said second bar providing for displacement of said cam member, said cam member having a shape such that the displacement of said finger along said arc from said first position to said second position is a function of the displacement of said container along said path of travel and said container is disposed in a position with its trailing side intersecting the arc of said finger when said finger reaches said second position.

4,047,364
WRAPPING PAPER STORING DEVICE IN A COIN WRAPPING MACHINE

Yasuo Murakami; Masatoshi Ushio, and Hirokuni Matono, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Filed Sept. 15, 1976, Ser. No. 723,636
Claims priority, application Japan, Sept. 30, 1975, 50-133514
Int. Cl.² B26D 7/00; B65B 41/16
U.S. Cl. 53—389 2 Claims



1. A wrapping paper storing device in a coin wrapping machine, comprising a rotary body rotatable about a shaft, a plurality of wrapping paper placing beds for placing thereon rolls of wrapping paper with axes perpendicular to respective placing beds, said placing beds lying in planes radially disposed relative to said shaft, wrapping paper roll supporting spindles so positioned according to the height of respective rolls of

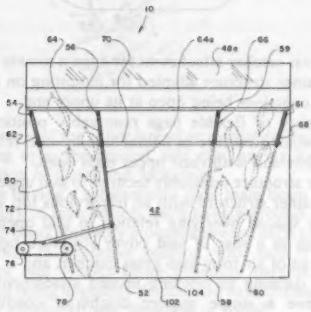
wrapping paper that, when said rotary body is rotated, the outer upper edge portions of the rolls of wrapping paper placed on said placing beds trace orbits lying in one and the same circle, placing angles of the placing beds being unequally formed in such a manner that the lower surface of each adjacently preceding placing bed is positioned as close as possible to the inner upper edge portion of the roll of wrapping paper on the succeeding placing bed.

4,047,365

AUTOMATIC LEAF SPREADER FOR A TOBACCO HARVESTER

Charles W. Suggs, 1507 Trailwood Drive, Raleigh, N.C. 27606

Filed Aug. 25, 1975, Ser. No. 607,218
Int. Cl.[2] A01D *45/16*
U.S. Cl. 56—27.5 **6 Claims**



6. A tobacco harvester having an automatic leaf spreading mechanism for generally uniformly spreading and distributing harvested tobacco leaves over substantially the entire cross sectional area of a leaf receiving structure, said tobacco harvest comprising:

a. a frame structure;

b. defoliating means mounted on said frame structure for defoliating tobacco leaves from respective tobacco stalks during the tobacco harvesting operation as said tobacco harvester moves through the field;

c. conveying means supported on said frame structure for receiving the defoliated tobacco leaves and for conveying the tobacco leaves from said defoliating means;

d. a leaf receiving structure normally operatively associated with said tobacco harvester during the harvesting operation for receiving the defoliated leaves, said leaf receiving structure during the harvesting operation having an opened top wherein the receiving structure may be filled by directing tobacco leaves into the top thereof during the harvesting operation;

e. leaf spreading means operatively interposed between said conveying means and said leaf receiving structure for uniformly spreading the harvested tobacco leaves both fore-and-aftly and laterally side to side over substantially the entire horizontal cross sectional area of said leaf receiving structure during the filling operation thereof;

f. said leaf spreading means for spreading the leaves both fore-and-aftly and laterally side to side relative to the opened top said said leaf receiving structure includes at least one movable leaf passageway having inlet and outlet openings with said inlet opening adapted to receive tobacco leaves leaving said conveying means and wherein the received tobacco leaves move through said leaf passageway and exit the outlet opening therein;

g. said fore-and-aftly and laterally side to side movement constitutes first and second directions of movement and wherein said movable passageway comprises a first pair of spaced apart sides movably mounted above the opened top of said leaf receiving area and adapted to move thereacross in a first direction, and a second pair of spaced apart sides pivotably mounted between said first pair of sides and movable independently thereof in a second direction generally perpendicular to said first direction such that during the spreading operation the area bounded by the first and second pair of sides define the leaf passageway; and

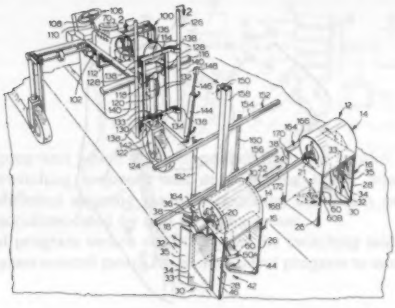
h. drive means operatively connected to said leaf spreading means for simultaneously driving said first and second pair of sides so as to give rise to a fore-and-aft and lateral side-by-side leaf spreading pattern.

4,047,366

TOBACCO TOPPING APPARATUS

John Balthes, Port Burwell; Garry Balthes, Tillsonburg, and William Palmer, Straffordville, all of Canada, assignors to Balthes Farm Equipment Manufacturing Limited, Tillsonburg, Canada

Filed May 7, 1976, Ser. No. 684,149
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—63 **12 Claims**



1. A tobacco topping apparatus, suitable for mounting on a tobacco harvester, said tobacco topping apparatus having a housing assembly in which power operated cutting means having a substantially horizontally disposed cutting blade for topping a tobacco plant is secured; said assembly having wall means defining a front opening therein opening in the direction of movement of the apparatus down a row of tobacco plants when the apparatus is used to top such row of tobacco plants and a discharge opening therein, the area of the wall means in which said discharge opening is situated being determined by the direction of rotation of the cutting blade of the cutting means a base having, base in the direction of movement of the apparatus when the apparatus is used to top the row of the tobacco plants, said guide means for serving to guide the stalk of the plant into the narrow slot and a deflector disposed adjacent the discharge opening in the wall means for deflecting the flower portions discharged through the opening and deposit them between the rows of tobacco plants; power operated blower means surmounting the assembly adjacent said front opening of said hopper assembly for directing air downwardly onto the upper leaves of the tobacco plant, when the apparatus is moved down the row to tobacco plants to initiate the deflection of the leaves downwardly to expose the flowering portion prior to the base passing over the deflected leaves whereby when said base passes over such leaves, it holds them down under said base during the cutting operation out of contact with said cutting blade; said substantially horizontally disposed cutting blade being disposed for rotation over a portion of said slot for severing the stalk of the tobacco plant below the flowering portion when the stalk is guided by the guide means toward the cutting means; means secured for rotation with the cutting blade to clear the severed flower portion out the discharge opening in the wall means for deposition between rows of tobacco plants; means secured to said

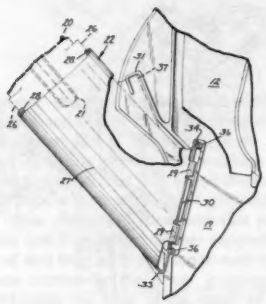
blower means for operating said blower means; means secured to said cutting means for operating said cutting means, and means secured to said means to clear the severed flower portions for operating said means to clear the severed flower portions for operating said means to clear the severed flower portions.

4,047,367

ROTARY MOWER BAGGING APPARATUS

Richard A. Thorud, Bloomington, Minn., assignor to The Toro Company, Minneapolis, Minn.

Filed Aug. 2, 1974, Ser. No. 494,051
Int. Cl.² A01D *35/22*
U.S. Cl. 56—202 **13 Claims**



1. Bagging apparatus for a rotary mower having a housing substantially enclosing a blade mounted for rotation about a vertical axis, said housing having a discharge opening for discharge of grass particles cut by said blade from the interior of said housing, comprising:

a. deflector means hingedly attached to said housing and having a longitudinal axis, said deflector means defining a discharge passageway along said longitudinal axis and pivotable about a generally horizontal axis so that pivotal movement of the deflector means covers and uncovers said discharge opening;

b. yieldable means for urging said deflector downward toward the top surface of said housing;

c. a tubular chute member including a top wall and adjoining side walls which define a longitudinal passageway having an axis that is aligned with the longitudinal axis of said deflector means when said tubular chute and said deflector means are attached to each other, one end of said chute member being adapted to mate with said discharge opening, the opposite end of said chute member being adapted to receive a grass-catching bag; and

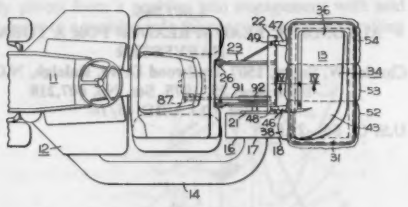
d. elongated mating channel and projection means, one each carried by said chute and said deflector, said elongated mating channel and projection means each having a longitudinal axis parallel to the aligned axes of said deflector means and said discharge passageway, whereby an operator may attach said chute member to said mower by the axial insertion of said chute member in said deflector means with said elongated channel and projection means cooperating in attachment to permit rotation of said deflector means upward by movement of the inserted chute member downward into contact with said housing.

4,047,368

ATTACHMENT FOR COLLECTING MOWER DISCHARGE IN A PLURALITY OF BAGS

James F. Peterson, Cedarburg, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 559,968, March 19, 1975, abandoned. This application July 29, 1976, Ser. No. 709,871
Int. Cl.² A01D *35/22*
U.S. Cl. 56—202 **12 Claims**



1. A grass catcher attachment for a lawn mower comprising:

a container structure adapted for mounting on said mower, said container being open at its upper end,

a plurality of flexible bags removably positioned in said container structure in lateral side-by-side relation to one another and with their upper ends open,

a cover structure releasably secured to said upper end of said container structure with an impervious top wall in vertically spaced overlying relation to said open bags and a screen in a rear of said cover structure permitting discharge of air from said grass catcher, and

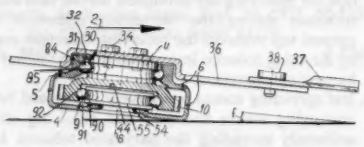
means defining an opening in said attachment adpated to receive a single mower discharge conduit directing mower discharge into the space between the upper open ends of said bags and said top wall of said cover structure whereby said plurality of bags simultaneously receive mower discharge.

4,047,369

MOWING DEVICE

Pieter Adriaan Oosterling, and Hendricus Cornelis van Staveren, both of Nieuw-Vennep, Netherlands, assignors to Multinorm, B.V., Nieuw-Vennep, Netherlands

Filed Nov. 14, 1975, Ser. No. 632,017
Claims priority, application Netherlands, Dec. 18, 1974, 7416533
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 **10 Claims**



1. A rotary mower assembly comprising, in combination:

an elongate housing adapted to extend transverse to the direction of mower movement, said housing including a bottom portion and a cover portion defining an enclosure;

a gear train disposed within said enclosure defined by the housing and including a set of longitudinally spaced cutter driving gears and coupling gears drivingly interconnecting said cutter driving gears;

lower ball bearing means mounted on said bottom portion of the housing for rotatably supporting each cutter driving gear;

upper ball bearing means mounted on said cover portion of the housing for rotatably supporting each cutter driving gear; and

a cutter member rigidly secured to each cutter driving gear and lying above said cover portion of the housing.

4,047,370

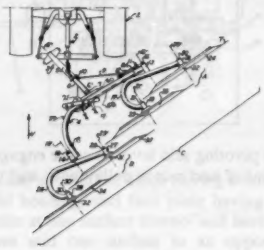
RAKE

Norman C. Eve, R.R. No. 2, New Albany, Ind. 47150

Filed June 9, 1976, Ser. No. 694,314

Int. Cl.[2] A01D *77/00*

U.S. Cl. 56—377 **7 Claims**



1. A rake adapted for either lateral or medial displacement of material lying upon the ground, said rake having a predetermined direction of travel and including:

A. a frame having a substantially rigid main beam and

B. a plurality of rake wheels, each having ground engaging tines and being rotatably mounted toward each end of said main beam in operative relation with said frame, the planes of said wheels being generally parallel to each other and being angularly disposed so as to define an acute angle in relation to said direction of travel;

C. the improvement for the variable adjustment of the planes of said wheels on each end of said beam from a parallel relation to an intersecting relation relative to each other for the medial displacement of material coming into engagement with said ground engaging tines, which comprises, in combination

1. first and second elongated beam members, in which at least one of said beam members is bent along its longitudinal axis,

2. coupling means for coupling said elongated beam members together in end to end relation in a first fixed position to form the rigid main beam,

3. pivot means associated with said coupling means for pivoting said main beam members relative to each other in a horizontal plane in the intended direction of travel of said rake to a second fixed position and to change the relationship of the planes of said rake wheels at one end of said beam from a parallel to intersecting relationship, relative to the planes of said rake wheels at the other end of said beam, and,

4. locking means for locking said beam sections in either said first or in said second position.

4,047,371

SPINNING MACHINE FACILITY WITH A PLURALITY OF OPEN END SPINNING MACHINES AND AT LEAST ONE SERVICING INSTRUMENT

Fritz Stahlecker, Bad Uberkingen, Germany, assignor to Hans Stahlecker and Fritz Stahlecker, both of Germany

Continuation-in-part of Ser. No. 732,880, Oct. 15, 1976. This application Nov. 1, 1976, Ser. No. 737,265

Claims priority, application Germany, Dec. 13, 1975, 2556237

Int. Cl.[2] D01H *15/00, 11/00, 13/14, 1/12*

U.S. Cl. 57—34 R **11 Claims**

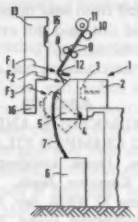
1. Servicing apparatus for a plurality of spinning machines comprising:

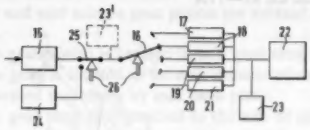
servicing means for servicing spinning assemblies of the spinning machines, said servicing means including function elements for carrying out servicing operations,

moving means for moving said servicing means to respective servicing positions adjacent the respective spinning assemblies to be serviced,

program control means for controlling switching sequences and switching times of drives for said function elements,

said program control means including a plurality of control





programs which are distinguished from one another as to switching sequence and/or switching times, whereby different spinning machine operating conditions can be accommodated by said servicing means,

and program switch control means for switching said program control means from one control program to another.

4,047,372

PNEUMATIC THREADER FOR TWISTING APPARATUS

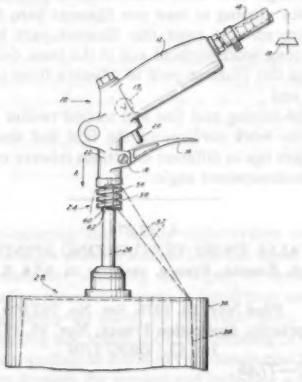
Aloys Horstmann, Greven, and Reinhardt Veltel, Everswinkel, both of Germany, assignors to Hamel GmbH Zwirnmaschinen, Munster, Germany

Filed Sept. 17, 1976, Ser. No. 724,460

Claims priority, application Germany, Sept. 18, 1975, 2541690

Int. Cl.[2] D01H *13/04, 13/12*

U.S. Cl. 57—34 R **9 Claims**



1. In combination with a tube having an open filament-receiving end, a threading apparatus comprising:

a nozzle formed with a passage and having a formation interfittable with said open end with said passage directed into said open end, said nozzle being formed at said pas-

sage with a thread-receiving slot opening toward said tube; and

means for directing a stream of gas through said passage past said slot and into said open end when same is fitted to said formation, whereby a filament in said slot can be blown by said stream into said open end and thereafter said nozzle can be disengaged from said open end with said filament sliding out of said slot, said slot extending helically in said nozzle past said formation.

4,047,373

FALSE-TWISTING METHOD AND APPARATUS FOR PRODUCING CRIMPED FILAMENT YARNS

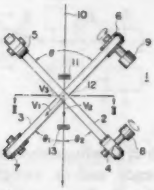
Isao Takai, Komatsu, Japan, assignor to Oda Gosen Kogyo Kabushiki Kaisha, Komatsu, Japan

Filed June 22, 1976, Ser. No. 698,778

Claims priority, application Japan, June 24, 1975, 50-76854; June 24, 1975, 50-76855; July 23, 1975, 50-89210; Nov. 25, 1975, 50-140289

Int. Cl.[2] D02G *1/06*; D01H *7/92*

U.S. Cl. 57—77.4 **24 Claims**



12. A false twisting apparatus of nipping type for producing crimped filament yarns, comprising:

power-driven at least one first twister member having a work surface and power-driven at least one second twister member having a work surface,

both of said first and second twister members being arranged so that their work surfaces cross each other at a predetermined angle in contact relationship to provide a crossing zone for nipping at least one filament yarn fed into this crossing zone to twist this filament yarn between the contacting work surfaces and at the same time therewith to urge this filament yarn to advance from said crossing zone, and

means for driving said first and second twister members so that the work surfaces of the first and second twister members run in different directions relative to each other at a predetermined angle.

4,047,374

FALSE TWIST TEXTURIZING SPINDLE

Jean Venot, Roanne, France, assignor to ASA S.A., Roanne, France

Filed Nov. 16, 1976, Ser. No. 742,099

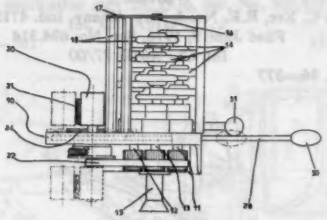
Claims priority, application France, Nov. 19, 1975, 75.36070

Int. Cl.[2] D02G *1/04*

U.S. Cl. 57—77.45 **7 Claims**

1. In a spindle adapted for use on a false twist texturizing machine which comprises a fixed platen disposed adjacent a tangential belt, a motor pulley mounted on an axle substantially perpendicular to the platen for rotation upon engagement with the tangential belt, three bosses mounted on the platen parallel to the motor pulley, each boss carrying at least one friction disc rotatable thereon in response to rotation of the motor pulley, the improvement comprising:

a lever pivotally attached to said platen, having said motor pulley mounted thereon, and



means for pivoting said lever to cause engagement or disengagement of said motor pulley with said tangential belt.

4,047,375

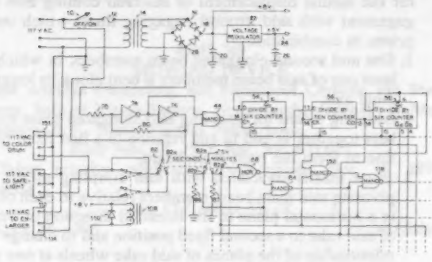
DARKROOM TIMER

Allan Wulff, 1351 Northgate Square, Reston, Va. 22090

Filed Nov. 17, 1975, Ser. No. 632,850

Int. Cl.[2] G04C *3/00*; G04E *1/00*

U.S. Cl. 58—21.13 **15 Claims**



1. A timer for switching power to and from an external unit, comprising:

a. actuator means;

b. digital means responsive to said actuator means for providing control signals;

c. coupling means for providing the timer with a periodic signal having a first characteristic frequency;

d. clock means responsive to said coupling means to produce a series of pulses having a second characteristic frequency related to said first characteristic frequency;

e. counter means adapted for receiving a desired selectable digital value, said counter means being responsive to said control signals from said digital means to count pulses from said clock means and produce an output when a digital value entered into said counter means has been counted out;

f. programming means for entering a desired selectable digital value into said counter means; and

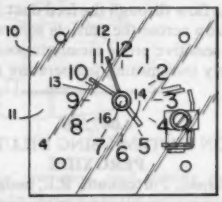
g. switch means responsive to said counter means for switching power to and from an external unit as a function of the condition of said counter means.

4,047,376

CLOCK MECHANISM

Frank Hubert Marz, Delavan, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 30, 1975, Ser. No. 627,375
Int. Cl.[2] G04C 3/00; H01H 51/22; H01F 7/08
U.S. Cl. 58—23 D 24 Claims



1. In an electrical automobile clock having a housing; a face plate within said housing, said face plate having a dial face normally viewable at one surface thereof and having an opening therein from said one surface to an opposite surface thereof; hour, minute, and second hands which rotate about a common concentric axis; and pulsing means for converting direct current to a series of electrical pulses having a repetition rate *t;* the improvement comprising:

a back plate within said housing oriented parallel to said face plate in proximity to said opposite surface thereof, the space between said plates forming a gear area,

an hour gear having a central axis;

a tubular hour shaft connecting the central axis of said hour gear to said hour hand through said opening in said face plate,

a minute gear, and a minute gear pinion axially affixed to said minute gear, said minute gear and said minute gear pinion having a common concentric axis;

a tubular minute shaft rotatable within said hour shaft and connecting the common concentric axis of said minute gear and pinion, concentrically with respect to said hour shaft, to said minute hand through said opening in said face plate;

a toothed second wheel, and a second wheel pinion axially affixed to said second wheel, said second wheel and said second wheel pinion having a common concentric axis;

a second shaft rotatable within said minute shaft and connecting the common concentric axis of said second wheel and pinion, concentrically with respect to said hour shaft and said minute shaft, to said second hand through said opening in said face plate;

wherein said central axis of said hour gear, said common concentric axis of said minute gear and pinion, and said common concentric axis of said second wheel and pinion are a single common axis;

a motion gear is meshing engagement with said minute gear pinion, and a motion gear pinion axially affixed to said motion gear with said motion gear pinion in meshing engagement with said hour gear, said motion gear and said motion gear pinion having a common concentric axis;

a motion gear shaft connecting said motion gear and pinion to said housing to be rotatable therewithin so that said motion gear shaft is rotatable about an axis which is parallel to and located outbound from said single axis;

an intermediate gear in meshing engagement with said second wheel pinion, and an intermediate gear pinion axially affixed to said intermediate gear with said intermediate gear pinion in meshing engagement with said minute gear, said intermediate gear and said intermediate gear pinion having a common concentric axis;

an intermediate gear shaft connecting said intermediate gear pinion to said housing to be rotatable therewithin so that said intermediate gear shaft is rotatable about an axis which is parallel to and located outbound from said single axis;

a ratchet wheel comprising

a. said second wheel,

b. a reciprocating lever, said lever having an armature coupled thereto,

d. a pawl for communicating motion to said second wheel, and

c. a pawl for preventing back motion of said wheel; and

a solenoid coupled to said pulsing means for receiving electrical pulses therefrom, and, when energized by one of said pulses, for attracting said armature,

whereby all gears in said clock, except for said intermediate gear and said motion gear and their associated pinions, are aligned along said single common axis and wherein

said hour gear is located in said gear area,

said motion gear and said motion gear pinion are located in said gear area,

said motion gear shaft is coupled to said back plate so as to be axially supported thereby while permitting rotation of said motion gear shaft about its axis,

said minute gear and said minute gear pinion are located in said gear area,

said intermediate gear pinion is located in said gear area,

said intermediate gear is located in an area outside of said gear area, separated therefrom by said back plate,

said intermediate gear shaft is connected to the axis of said intermediate gear at said outside area and is connected to the axis of said intermediate gear pinion at said gear area, said intermediate gear shaft being adapted to freely rotate about its axis within said back plate, and

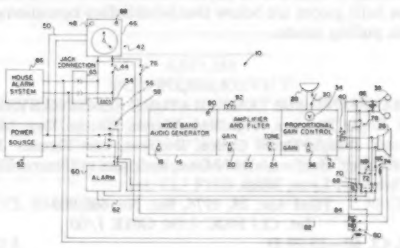
said second wheel pinion, said ratchet wheel, and said solenoid being located at said outside area.

4,047,377

SLEEP-INDUCING/INTERRUPTING AUDIO SYSTEM

Holly Banks, Jr., 4046 St. Monica Drive, Baltimore, Md. 21222

Filed Feb. 24, 1976, Ser. No. 660,988
Int. Cl.[2] G04B 37/12
U.S. Cl. 58—152 B 3 Claims



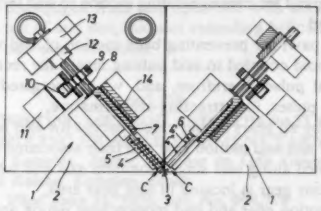
1. A sleep-inducing/interrupting audio system comprising: means for emitting a uniform audible hum-like signal for inducing sleep, means for adjusting the signal to mask ambient sounds, including means for adjusting signal tone and volume, means for sounding an alarm to interrupt sleep, including means for stopping said signal upon the sounding of the alarm, the means for sounding an alarm having connection for sounding said alarm through the speaker and including a clock having means for commencing the alarm sounding at an adjustably predetermined time, and the means for sounding the alarm further including connection for sounding the alarm through origination by a source such as a burglar alarm external to the audio system.

4,047,378

MACHINE FOR FORMING A BISMARCK CHAIN

Jouko Janne, 32700 Lauttakyla, Finland

Filed May 27, 1976, Ser. No. 690,612
Int. Cl.² B21L *7/00*
U.S. Cl. 59—20 **8 Claims**



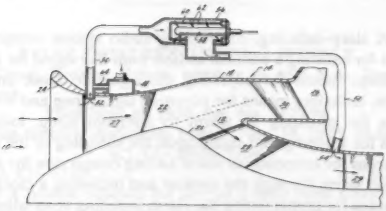
1. Machine for twisting a Bismarck chain in that the end of a helix formed of silver, gold or equivalent wire is intertwined by rotation crosswise with another helix and the helices thus affixed to each other are cut into pieces of a given length and the attachment of helical pieces is continued in the same manner, the machine comprising two twisting heads **(1)** each having a pin **(4)**, around which the wire helix **(3)** can be formed and which has been arranged to be reciprocatingly turnable and to be simultaneously reciprocatingly fed in its axial direction, the two twisting head **(1)** being arranged to feed periodically in turns and simultaneously to turn two wire helices **(3)**, the twisting heads **(1)** being positioned at an angle of about **90** degrees with reference to each other in two planes having a mutual vertical distance substantially equal to the inner diameter of the helix turn or slightly less; a wire cutting means **(18)** immediately adjacent to the ends of the feeding pins **(4)** (C) whereby the termination of the feed motion of the first twisting head starts the feed motion of the second twisting head, and the termination of the feed motion of the second twisting head starts operation of the wire cutting means **(13, 21*a*, 21*b*)**, the machine further comprising a chain pulling means **(30, 34)** grasping the chain and pulling it upwards, and a pair of chain holding jaws **(17)** extending upwards from the ends of the feeding pins and forming therebetween a space corresponding to the outline configuration of the chain so that the chain can slide therethrough, the lower ends of the chain holding jaws **(17)** being at such a level (B) that more than two but less than three helix pieces are below that level before operation of the chain pulling means.

4,047,379

TRANSIENT AIR TEMPERATURE SENSING SYSTEM

Neil Roger Brookes, Topsfield; Martin George Ray, Marblehead; Joseph David Cohen, Danvers, and Thomas Joseph McCarey, Boxford, all of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Apr. 28, 1976, Ser. No. 680,909
Int. Cl.² F02C *7/04*; G01K *1/00*
U.S. Cl. 60—39.09 D **5 Claims**



1. In a gas turbine engine of the type which includes an inlet supplying air to a compressor, a combustor and turbine in serial flow relation and a particle separator disposed intermediate the inlet, and compressor and wherein a pressure drop is created across the particle separator by air flowing therethrough, there is provided apparatus for measuring the temperature of the air entering the compressor comprising:

a feed duct having an inlet, disposed intermediate the engine inlet and the particle separator and an outlet disposed intermediate the particle separator and compressor whereby airflow through the feed duct is generated by the pressure drop across the particle separator, and

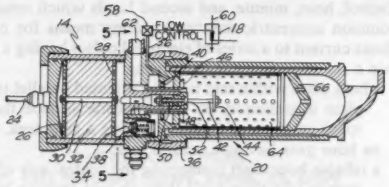
temperature sensitive probe means disposed in the feed duct for remotely transmitting temperature signals.

4,047,380

COMBUSTION SYSTEM USING DILUTE HYDROGEN PEROXIDE

Robert J. Heffernan, Portsmouth, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,671
Int. Cl.² F02C *3/20*
U.S. Cl. 60—39.46 R **8 Claims**



1. A combustion system using dilute hydrogen peroxide having a concentration less than 40 percent by weight and a fuel propellant which comprises:

a decomposition chamber for catalytically decomposing the dilute hydrogen peroxide having a concentration less than 40 percent by weight into liquid phase water and vapor phase oxygen as the decomposed components thereof;

a liquid/gas separator means for separating the liquid phase water and vapor phase oxygen of the decomposed dilute hydrogen peroxide, said separater means being mounted adjacent said decomposition chamber and being connected to said decomposition chamber;

means for feeding the components of the decomposed dilute hydrogen peroxide from said decomposition chamber into said liquid/gas separator means;

means for extracting a portion of the liquid phase water from the components of the decomposed dilute hydrogen peroxide being fed to said separater means; and

a combustion chamber for mixing the oxygen and the remaining water with the fuel and for igniting the mixture thereof, said combustion chamber being mounted adjacent said separater means and being connected to said separater means.

4,047,381

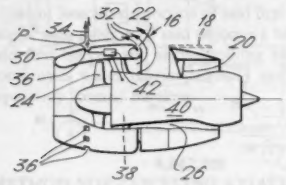
GAS TURBINE ENGINE POWER PLANTS FOR AIRCRAFT

Thomas Eric Smith, Ilkeston, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Sept. 21, 1976, Ser. No. 725,155
Claims priority, application United Kingdom, Oct. 11, 1975, 41751/75
Int. Cl.² F02K *3/02*
U.S. Cl. 60—226 A **4 Claims**

1. A gas turbine engine power plant including a thrust reverser capable of directing a reversed flow of air along an exterior surface of a cowl of the power plant whereby to effect

reverse thrust and thereby generate a mobile high pressure area on the cowl external surface, at the interface of forward flowing reversed airflow and ambient air, mobile high pressure area sensing means and mobile high pressure area stabilising



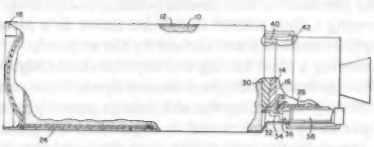
means whereby in operation, said sensing means senses the pressure change which occurs as the mobile high pressure area reaches it and actuates the mobile high pressure area stabilising means so as to stabilise the position of the mobile high pressure area with respect to a point on said cowl.

4,047,382

THRUST MANAGEMENT CONTROL PROPULSION SYSTEM

Clarence A. LeFebvre, San Jose, and Joseph M. Cabezut, Jr., Sunnyvale, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,153
Int. Cl.² F02K *9/04*; F16K *31/126*
U.S. Cl. 60—252 **1 Claim**



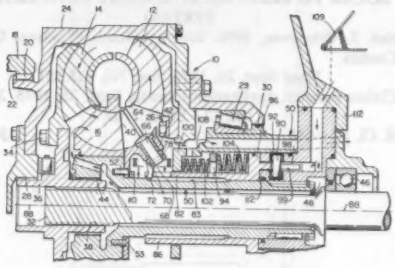
1. A control system for supplying uncured putty-like propellant into a missile combustion chamber comprising: a propellant storage chamber; means for pressurizing propellant in said chamber; said pressurizing means including a warm gas generator, an igniter for igniting said generator and a roll seal which acts on said propellant when actuated by gas from said generator; a movable injector; a metal web supporting said movable injector; said web being provided with propellant discharge openings therein; a seat provided with a rubber flow seal; said web being disposed between said propellant storage chamber and said combustion chamber for cooperation with said rubber flow seal to control the propellant flow between the injector and the seat; said injector and said seat provided with a double angle therebetween to serve as a radiation shield; an annular piston connected to said metal web and a hydraulic system to actuate said piston to move said web and injector in a forward or rearward direction.

4,047,383

TORQUE CONVERTER WITH VARIABLE STATOR

Lowell E. Johnson, East Peoria; Raymond P. Cobb, Washington; Frank W. Howard, III, Dunlap, and Dwayne D. Dietz, East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation-in-part of Ser. No. 699,777, June 25, 1976, abandoned, which is a continuation of Ser. No. 595,911, July 14, 1975, abandoned. This application Nov. 11, 1976, Ser. No. 741,005
Int. Cl.² F16D *33/04*
U.S. Cl. 60—354 **19 Claims**



1. An improvement in a fluid torque converter which includes a main stator communicating with a stationary member, a pump drivingly connected to an engine and a turbine output coupled to a drive shaft, the improvement comprising:

an auxiliary stator intermediate the main stator and the pump, said auxiliary stator including a plurality of holes therethrough adjacent the periphery thereof;

a plurality of vanes fixedly attached to a plurality of shafts rotatably mounted through said holes, said vanes being positioned to adjustably direct a flow of hydraulic fluid from the main stator past the vanes to the pump;

a plurality of handles, one attached at a fixed angle to an end of each of said shafts removed from the vanes thereon;

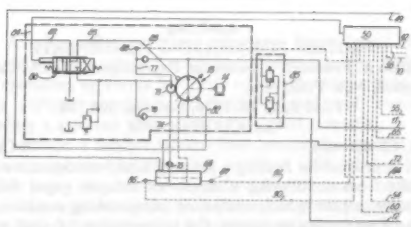
a sleeve including a plurality of slots at one end thereof, the number of slots being in one to one relation with the number of said handles, one handle being slidably held in each of said slots; and means for operator adjustment of the position of said sleeve in a direction which causes rotation of said handles.

4,047,384

PUMP JACK DEVICE

Minoru Saruwatari, Calgary, Canada, assignor to Canadian Foremost Ltd., Calgary, Canada

Filed June 23, 1976, Ser. No. 699,134
Claims priority, application Canada, Apr. 9, 1976, 249962
Int. Cl.² F15B *9/04*
U.S. Cl. 60—372 **30 Claims**



1. A pump jack comprising a double acting piston an cylinder motor; means for connecting a piston rod of said motor to a polished rod in a well head; a variable displacement type

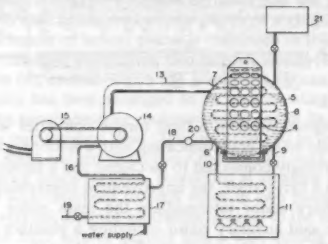
hydraulic pump having a pair of output ports; a pair of hydraulic conduits each placing one of said output ports in communication with an opposite end of said motor and forming a closed hydraulic loop with said motor and pump; drive means for said pump; and a pump control means including means indicative of desired instantaneous position and velocity of said piston for controlling the direction and volume of flow in said loop to thereby establish a total velocity profile during a complete pumping cycle and also to determine the length and position of the stroke of said piston rod.

4,047,385

SOLAR TO ELECTRICAL ENERGY CONVERTING SYSTEM

Heinz J. Brinjevec, 3990 Riberdy Road, Windsor, Ontario, Canada

Filed Sept. 21, 1976, Ser. No. 725,251
Claims priority, application Canada, Sept. 25, 1975, 236413
Int. Cl.² F01K *7/02*
U.S. Cl. 60—641 **3 Claims**



1. Apparatus and method for converting solar energy to electricity through the medium of heat comprising in combination a heating unit which collects the rays of the sun by means of convex lenses, which converge these rays into heat producing focal points which come in contact with a metal container, said container having a heating liquid whose boiling point is considerably higher than that of water, therein; and a steam producing pipe coil immersed in said heating liquid; means for breaking contact between said focal points and said container for the purpose of controlling the heat in said container; a steam turbine which is powered by said steam producing coil; a dynamo for producing electrical power which is operated by said steam turbine, a source of water which feeds said steam coil; a heat exchanger which preheats the water entering said steam coil, said heat exchanger utilizing the spent steam from said turbine for preheating the water; a furnace for heating said heating fluid to a steam producing temperature when the rays of the sun are not available; a storage tank, which communicates with said heating container, which contains a supply of heating fluid for the purpose of replenshing said fluid as required; and standard temperature and liquid flow controls for proper operation.

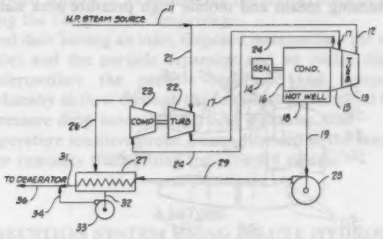
4,047,386

PROCESS FOR HEATING CONDENSATE

William A. Frondorf, Brownsville, Pa., assignor to SCM Corporation, New York, N.Y.

Filed June 10, 1976, Ser. No. 694,774
Int. Cl.² F01K *7/38*
U.S. Cl. 60—654 **4 Claims**

1. A process for heating a primary liquid condensate which results from condensing a supply of exhaust vapor from a primary turbine which comprises: compressing a minor portion of said exhaust vapor, the compressing of said minor portion being powered by a secondary turbine, the source for the secondary turbine being the same as that for the primary turbine; exchanging heat between said primary liquid condensate and the resulting compressed minor portion of exhaust vapor prior to any other heating of said primary liquid condensate; withdrawing from said heat exchanging the heated primary liquid condensate and a secondary liquid condensate resulting from condensation of said compressed vapor.



4,047,387

METHOD OF FORMING A SUBTERRANEAN WATER BARRIER AND A PLOW FOR USE THEREWITH

Yukio Tamura, Isehara; Katsu Hirosawa, and Koji Ogaki, both of Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed June 9, 1976, Ser. No. 694,174
Claims priority, application Japan, June 9, 1975, 50-76822[U]; June 12, 1975, 50-70187; June 12, 1975, 50-78694[U]; June 12, 1975, 50-78695[U]; June 12, 1975, 50-78696[U]
Int. Cl.² E02B *13/00*
U.S. Cl. 61—13 **18 Claims**

1. A method of forming a continuous flexible subterranean water barrier of congealed thermoplastic material, said barrier composed of a plurality of separately formed barriers having finite dimensions, each separate barrier in transverse section having a central portion continuous with lateral side portions wherein each side portion is inclined relative to said central portion and terminate in a lateral edge at an elevation different from the elevation of said central portion, comprising:

I. forming a first barrier as defined above at a preselected depth beneath the soil surface by the steps of:

a. moving a plow having a cavity therein through the soil to continuously displace the soil upwardly at said depth thereby separating the soil into an upper portion supported by the plow and an exposed lower portion;

b. concurrently introducing said thermoplastic material into the cavity of said plow to fill it up without leaving any void portion;

c. ironing said thermoplastic material so as to spread same over uniformly in the transverse direction of said plow by passing said thermoplastic material through a restricted outlet from said plow so as to form a congealing coating of said material, said restricted outlet being defined between a rear bottom surface of said plow and the lower exposed soil portion and being located at the rear end portion of said plow; and

d. continuously covering said coating by free flow of said supported soil simultaneously with releasing an excess pressure on said thermoplastic material within said plow which exceeds a balanced pressure created by a soil pressure at the point of tail end of said plow and a pressure of said thermoplastic material inside said plow thereby preventing an excess outflow of said material

from said plow, whereby said first barrier of uniform thickness is formed; and

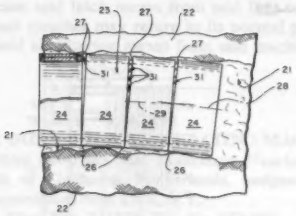
II. forming an adjoining barrier in a path parallel to the first path and at the preselected depth to engage said first barrier by repeating the steps employed in forming the first barrier and including continuously intersecting the adjacent lateral side portion of said first barrier with a new lateral side portion of said adjoining barrier, thus joining said first barrier and said adjoining barrier to provide a continuous water barrier laterally and longitudinally by separately formed barriers.

4,047,388

METHOD FOR COUPLING AXIALLY ALIGNED TUNNEL SECTIONS AND APPARATUS THEREFOR

James W. Howlett, Oakland, Calif., assignor to Howlett Machine Works, Berkeley, Calif.

Filed June 30, 1976, Ser. No. 701,344
Int. Cl.² E21D *11/08*
U.S. Cl. 61—45 R **4 Claims**



1. A method for coupling together a first structure and a second structure while positioned in close proximity to each other and while positioned in slightly misaligned relation, said method including the steps of mounting coupling means to said first structure, mounting a coupling tendon to said second structure, coupling said tendon to said coupling means and thereafter applying an axial tension force to at least one of said tendon and said coupling means while supporting said tension force by said structures, wherein the improvement in said coupling method permitting coupling of misaligned structures is comprised of the steps of:

providing said coupling means as a member having a tapered socket with a tapered thread therein;

providing said tendon with a tapered threaded end dimensioned to mate with said socket; and

coupling said tendon means to said coupling means by threadably engaging said tapered threaded end of said tendon with said tapered thread in said socket until said end is cinched down in said socket.

4,047,389

PRECAST CONCRETE PILE, AND COFFERDAMS

Yue-Chyou Yang, San Francisco, Calif., assignor to T. Y. Lin International, San Francisco, Calif.

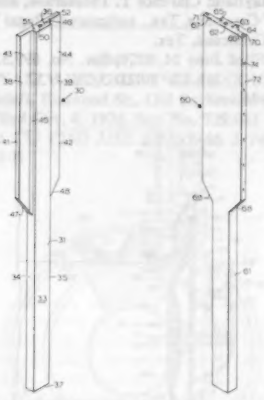
Filed Mar. 22, 1976, Ser. No. 669,341
Int. Cl.² E02D *5/10, 5/30*
U.S. Cl. 61—59 **6 Claims**

1. A precast concrete pile, comprising a rectangular main stem extending from the top to the bottom of said pile and having first and second pairs of parallel faces,

said pile having a lower portion consisting exclusively of said main stem and

an upper portion incorporating, integrally with said stem, a pair of generally rectangular flanges each extending out from one face of said first pair and having a first face in alignment with one face of said second pair and a second face parallel thereto and set back from the other face of said second pair, said second face being joined to said stem by a splay, said flanges being thinner than said stem, and terminating in vertical end edges,

the upper end of said upper portion being flat, the lower end of said upper portion being splayed into said lower portion,



a vertical grout-receiving passage going all the way through each said flange from said upper end to said lower end, each said passage being located near said end edge of a said flange, and

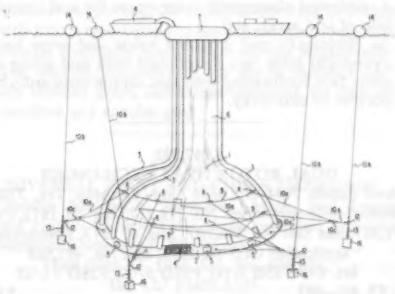
a series of outlet passages at intervals leading outwardly from said grout-receiving passage to and through said end edge.

4,047,390

SEA TENT

William D. Boyce, II, 1 Boulevard de la Gare 95760, Valmondois, France

Filed Aug. 20, 1974, Ser. No. 498,925
Int. Cl.² B63C *11/00*
U.S. Cl. 61—69 R **16 Claims**



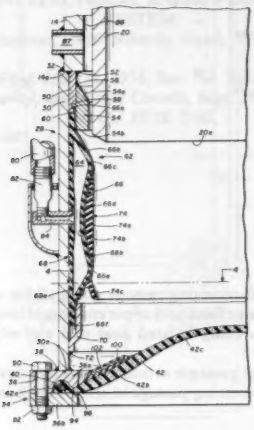
1. A submersible container apparatus for isolating from adjacent water, a selected water bottom area together with an area extending upwardly from said selected bottom area to the water surface, comprising a flexible closed wall member bounding a selected water bottom area and extending to the water surface, a flexible tubular base member secured to the lowermost portion of said wall member, said tubular base member being adapted to receive flowable fill means for holding said base member under the influence of gravity against the water bottom bordering said selected water bottom area, and a plurality of fill tube means communicating at their lower ends with the interior of said tubular base member, secured along their length to said flexible closed wall member, and having upper ends positioned substantially at the top of said closed

wall member, said upper ends of said fill tubes being adapted to receive said fill means for transmission through said fill tube means to said tubular base member.

4,047,391
GROUT SEAL

Windel O. Mayfield; Clarence T. Thomerson, and Tom C. Waldrop, all of Corsicana, Tex., assignors to Regal Tool & Rubber Co., Inc., Corsicana, Tex.

Filed June 24, 1976, Ser. No. 699,321
Int. Cl.[2] E02D *5/14, 5/52*
U.S. Cl. 61—94 **17 Claims**



1. A grout seal for a piling driven through a cylindrical platform leg into submerged strata which comprises:

a. an array of spring members having upper and lower end portions of cylindrical configuration, the lower and upper extremities of said portions, respectively, defining boundaries of inward diversion to form a central outwardly bowed portion of said array,

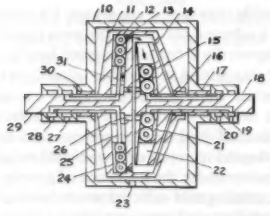
b. a reinforced elastomeric outer cover for said central portion of said array, and

c. an elastomeric pad mounted inside said array having a cylindrical inner face for contact with said piling and an outer face conforming with said central outwardly bowed portion of said array.

4,047,392
DUAL ROTOR HEAT EXCHANGER

Michael Eskeli, 7994-41 Locke Lane, Houston, Tex. 77042

Continuation-in-part of Ser. No. 219,212, Jan. 20, 1972, Pat. No. 3,791,167, and Ser. No. 386,207, Aug. 6, 1973, abandoned. This application Oct. 18, 1973, Ser. No. 407,665
Int. Cl.[2] F25B *9/00;* **F25D** *9/00;* **F28D** *11/02*
U.S. Cl. 62—402 **3 Claims**

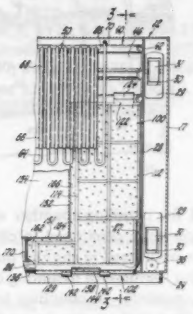


1. A heat exchanger comprising a first rotor and a second rotor, means for mounting said rotors for independent rotation, a closed, first-fluid circulation path through said rotors, circulation path comprising a first passage extending approximately radially outwardly within said first rotor a second passage extending approximately radially outwardly at least partially within said second rotor, first fluid communication means communicating between the radially outward ends of said first and second passages, and second fluid communication means comprising first and second conduits through said first and second rotors respectively, communicating between the radially inward ends of said first and second passages, a heat removal exchanger carried by one of said rotors to remove heat from said first fluid being heated by centrifugal force, and a heat addition heat exchanger carried by one of said rotors to add heat to said fluid being cooled by expansion against centrifugal force.

4,047,393
REFRIGERATOR FORCED AIR CONDENSER FILTER

Robert S. Hanson, Kettering, and Ralph R. Rigg, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 8, 1976, Ser. No. 730,977
Int. Cl.[2] F25D *17/06;* **F25B** *39/04*
U.S. Cl. 62—428 **3 Claims**



1. A household refrigerator adapted to be supported on a floor comprising an outer cabinet having a front wall and a machinery compartment in the lower portion thereof, said front wall including a front opening communicating with said machinery compartment and being defined in part by a cabinet frame member along its lower portion and a free edge of said front wall along its upper portion, said machinery compartment including a refrigeration condenser including plate means at the rearward portion of said machinery compartment and adapted for air-cooling thereof, said machinery compartment having a bottom opening adapted to be in spaced relation to said floor and defined in part at its rearward end by said plate means and at its forward end by said lower frame member, forced air circulating means for circulating a stream of air through said openings into said machinery compartment and into air-cooling relation with said condenser, removable air filtering means adapted for coextensively covering both the front and bottom openings in said machinery compartment, said removable air filtering means including a front filter batt member for closing said front opening and a bottom filter batt member for closing said bottom opening, said front and bottom filter batt members each having a support border frame extending around the peripheral edges thereof, the border frame for said bottom batt member having a rearward transverse frame portion including attaching means operative to engage said rear plate means, said attaching means configured to form a lower downwardly bowed runner adapted to contact and slide along the floor and an upper flange, said upper flange having an upwardly and rearwardly diverging flexible lead-in cam

member adapted to contact the condenser, whereby said attaching means is guided by said runner and said cam member into engaging alignment with said rear plate means upon the rearward sliding movement of the bottom filter batt member of said air filtering means to close said bottom opening, the support border frame of said front and bottom filter batt members being flexibly interconnected along their adjoining transverse frame edges by a flexible hinge panel which conforms with said cabinet frame member when said bottom opening is closed by said bottom filter batt member, said front filter batt member having a normal position extending forwardly from said hinge panel in a plane offset upwardly from the plane of said bottom filter batt member and a stressed position extending upwardly from said hinge panel, the border frame for said front filter batt member having latch means selectively engageable with the free edge of said front opening when said front filter batt is in said stressed position, said front filter batt member being movable in accordance with the flexibility of said hinge panel to effect the engagement of said latch means with said free edge, whereby said front filter batt member is maintained by its stressed position in closed and covering relation with said front access opening when said air filtering means is in said machinery compartment, and whereby downwardly pressure on said front filter batt member effects a slight flexing of said hinge panel to release said latch means from said free edge so said front filter batt member may return to its normal position for removal of said air filtering means from said machinery compartment.

4,047,394

^{3}HE-^{4}HE DILUTION REFRIGERATING MACHINE

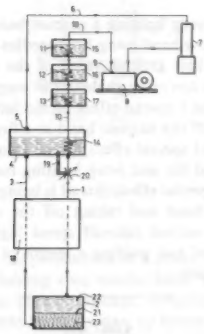
Adrianus Petrus Severijns, and Franciscus Henricus Eduard Aarts, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,007

Claims priority, application Netherlands, Apr. 24, 1975, 7504835

Int. Cl.^{2} F25B *19/00*

U.S. Cl. 62—502 **3 Claims**



1. A ^{3}He-^{4}He dilution refrigerator operable with a supply of gaseous helium, which comprises pump means for compressing and circulating said gaseous helium, means for cooling and condensing the compressed helium, a heat exchanger for further cooling the condensed helium, a mixing chamber for receiving the cooled condensed helium for separation into a liquid concentrated ^{3}He phase and a liquid diluted ^{3}He phase, a supply duct for flowing the condensed helium from said cooling and condensing means through said heat exchanger to said mixing chamber, a separating reservoir for receiving the liquid diluted ^{3}He phase for separation into gaseous ^{3}He and liquid ^{4}He, a return duct for flowing said liquid diluted ^{3}He phase from said mixing chamber through said heat exchanger in heat-exchange relation with said supply duct to said separating reservoir, a suction duct for flowing said gaseous ^{3}He from said separating reservoir to said pump means, and a variable-flow restriction member positioned in said supply duct between said cooling and condensing means and said heat exchanger, said variable-flow restriction member being operated by the flow of condensed helium and, at a pressure difference exceeding a threshold value, allowing said flow of condensed helium to pass substantially independently of said pressure difference.

4,047,395

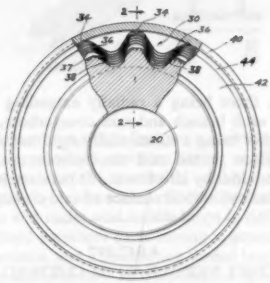
TORSIONALLY RESILIENT GEAR COUPLING

Wilfrid H. Bendall, Elmwood St., Old Saybrook, Conn. 06475

Filed Oct. 4, 1976, Ser. No. 729,841

Int. Cl.^{2} F16D *3/52, 3/56, 3/66, 3/14*

U.S. Cl. 64—15 B **10 Claims**



1. A torsionally resilient gear coupling for connecting axially spaced driving and driven members, said coupling comprising an externally toothed gear connected to each of said members interconnected by a resilient annular gear bridging the space between the gears, said annular gear comprising a plurality of concentric, uniformly corrugated flexible laminas, the corrugations thereof being shaped to mesh tangentially with each other and with the teeth of the externally toothed gears; a concentric sleeve member extending axially over the periphery of the annular gear and in retentive contact therewith, said sleeve member supporting the radial component of tangential gear tooth forces transmitted to the annular gear, said annular gear being in resiliently compressed driving engagement between the internal periphery of the sleeve member and the externally toothed gears, and means enclosing the ends of the sleeve member and annular gear.

4,047,396

UNIVERSAL JOINT AND CROSS THEREFOR

John Christee McElwain, Rochester, Mich., and Lawrence Howard Hogan, Chagrin Falls, Ohio, assignors to Rockwell International Corporation, Pittsburgh, Pa.

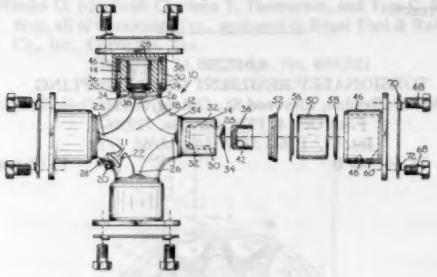
Filed May 13, 1976, Ser. No. 686,038

Int. Cl.^{2} F16D *3/26*

U.S. Cl. 64—17 A **10 Claims**

1. A universal joint including a cross operably connected therein, said cross comprising a body having four trunnions extending therefrom along two mutually perpendicular lines, a lubrication network in said body and said trunnions to provide lubrication to the cylindrical outer bearing surface of said trunnions, said network including a plurality of branches in communication with each other and terminating in a counterbore provided internally in each of said trunnions, each said counterbore having a cylindrical inner surface coaxial with said cylindrical outer bearing surface of said trunnions, said counterbore being open at its end opposite said branches, a flow metering member having at least one metering orifice therethrough fixedly disposed within each of said counterbores to meter lubricant flowing through each of said branches downstream into said counterbore and to the bearing means in

bearing engagement with the cylindrical outer bearing surface of said trunnions, said filtering means being a screen provided upstream of each of said metering orifices to filter particulate matter from said lubricant to avoid clogging of said metering orifice and to ensure the free flow of said lubricant through



said orifice, there being a radially extending surface at the junction of each branch and said counterbore, said metering orifice member being a substantially rigid member and is held fixedly in place within said counterbore near said radially extending shoulder by interference fit between its outer surface and said inner cylindrical surface of said counterbore.

4,047,397

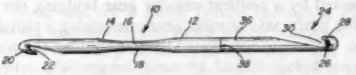
CROCHET NEEDLE WITH CUTTING MEANS

Shirley P. Laliberte, 2724 E. Main St., Waterbury, Conn. 06705

Filed May 5, 1976, Ser. No. 683,464

Int. Cl.² D04B *3/02*

U.S. Cl. 66—118 **10 Claims**



1. A crochet needle comprising an elongated body portion having a generally smooth surface for manual gripping and manipulation, a hook formed integrally at one end portion and bent back upon itself so as to open generally toward said body portion for engagement with and manipulation of an elongated flexible strand of material, and a means for severing said flexible strand of material at an end portion of said needle opposite said one end portion.

4,047,398

YARN GUIDE FINGER FOR POSITIVE YARN SUPPLY APPARATUS

Josef Fecker, Steinhofen-Bisingen, and Gustav Memminger, Freudenstadt, both of Germany, assignors to Firma Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Freudenstadt, Germany

Filed Dec. 19, 1975, Ser. No. 642,257

Claims priority, application Germany, Dec. 31, 1974, 2461938

Int. Cl.² D04B *15/48*; B65H *51/20*; D04B *15/54*

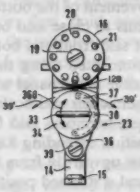
U.S. Cl. 66—132 R **21 Claims**

1. Positive yarn supply apparatus comprising

a support frame **(7, 14)**;

a rotatable storage drum capable of rotation in a clockwise or counter-clockwise direction **(1)** journalled in the support **(7, 14)** for winding thereon yarn **(24)** to form a stack of yarn storage supply windings **(27)**, the yarn being supplied tangentially to the surface of the drum **(1)** and being removed axially over the end thereof;

and means **(23; 29, 30, 31, 32)** controlling the pull-off position of the yarn **(24)** including an essentially elongated and symmetrical yarn guide element adjustably secured to the support frame for its selective extension into the path of the yarn so that it is contacted at either side by the yarn



when placed in selectively different yarn guiding positions and thereby positively guides the yarn regardless of the direction of rotation of the storage drum **(1)**.

4,047,399

KNITTING BRAIDS

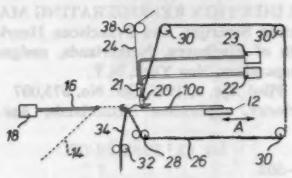
Robert Walter Frost, Tilton-on-the-Hill, and Anne Winnifred Morris, Anstey, both of England, assignors to R. W. Frost Limited, Syston, England

Filed Dec. 1, 1975, Ser. No. 636,757

Claims priority, application United Kingdom, Jan. 17, 1975, 2011/75

Int. Cl.² D04B *15/88*

U.S. Cl. 66—149 R **8 Claims**



1. Method of warp knitting a narrow band comprising,

knitting a narrow band using first needles of a warp knitting machine to knit ground yarns of the narrow band and using at least one inlay guide of the warp knitting machine to incorporate a special effect thread into the narrow band and taking off the narrow band at a first take-off speed;

knitting the said special effect thread using at least one second needle of the said warp knitting machine at the same time as the special effect thread is being incorporated into the narrow band and taking off the said special effect thread at a second take-off speed higher than the first take-off speed and guiding a length of the thread to the said inlay guide.

4,047,400

MOISTURE ABSORBENT BAND

James L. Thorneburg, Statesville, N.C., assignor to Thorneburg Hosiery Mill, Inc., Statesville, N.C.

Filed Sept. 13, 1976, Ser. No. 722,679

Int. Cl.² D04B *1/02, 1/18, 1/24*

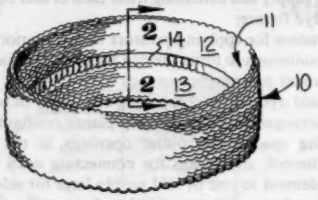
U.S. Cl. 66—171 **11 Claims**

1. A moisture absorbent band including a central opening adapted to be worn with a portion of the body extending therethrough and comprising

a. a cylindrical band of double ply knit fabric of predetermined width and including successive courses of body yarn stitch loops extending circumferentially of said band and defining parallel wales of stitch loops extending perpendicularly of said courses and continuously from one ply to the other of said band,

b. a single connector tab, said connector tab comprising a

single layer of knit fabric of a relatively narrow width and including successive courses of body yarn stitch loops and a greater number of wales than the number of wales contained in said double ply fabric, said single layer including an initial course integrally knit with the initial and the final



courses of said band to integrally join the corresponding adjacent edges of said double ply fabric, said single layer including a final course defining a free edge, and

c. said band including a moisture absorbent yarn in at least certain courses of said band.

4,047,401

METHOD FOR FORMING A CLOSED TOE

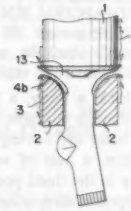
Siegfried Nurk, Berkheim, Germany, assignor to Gottlieb Eppinger, Denkendorf, Germany

Continuation of Ser. No. 340,950, March 14, 1973, abandoned. This application Mar. 19, 1975, Ser. No. 559,785

Claims priority, application Germany, Mar. 16, 1972, 2212749

Int. Cl.[2] D04B *15/02, 9/54, 9/56*

U.S. Cl. 66—187 **9 Claims**



1. A process for the production of a closed toe on a circular knitting machine having two needle beds, each needle bed having at least one knitting system, comprising the steps of knitting a main fabric body portion by forming loops on needles of at least one of said beds; then knitting a closed toe portion by producing two layers of tubular fabric, one within the other, by knitting only with selected needles of said one needle bed at one of the knitting systems and only with selected needles of the other needle bed, when in a predetermined manner part of the loops of the last knitting course of the main portion are distributed to said selected needles of said one needle bed and the remaining loops of said last knitted course to said selected needles of the other needle bed; subsequently rotating the two needle beds relative to each other so that the two layers of the tubular fabric are twisted relative to each other through at least 180° whereas the stitches comprising the last course of said body portion are not held by any needle during this twisting; knitting at least one connecting course using all loops of the last courses of said two layers, and finally joining said two layers together in a ladder-proof manner.

4,047,402

REINFORCEMENT FOR SLIDE FASTENERS

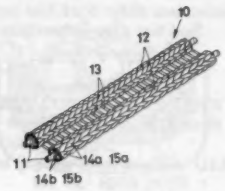
Yoshio Matsuda, Nyuzen, and Yoshinori Fujisaki, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Dec. 1, 1975, Ser. No. 636,540

Claims priority, application Japan, Dec. 3, 1974, 49-147151[U]

Int. Cl.[2] D04B *21/00*

U.S. Cl. 66—195 **3 Claims**



1. A reinforcement for a slide fastener comprising a plurality of cylindrical, warp-knitted members having needle loops and sinker loops interconnected therewith, said sinker loops extending in diagonally criss-crossed relation to each other and alternately over and under said needle loops to define a plurality of warp-knitted members each having a generally tubular knitted configuration, and a connecting thread laid in weftwise to interconnect said plurality of warp-knitted members transversely in parallel, spaced-apart relation to each other.

4,047,403

APPARATUS FOR THE CONTINUOUS WET TREATMENT OF TEXTILES IN ROPE FORM

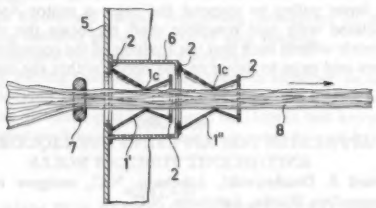
Hans-Ulrich von der Eltz, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 20, 1976, Ser. No. 716,242

Claims priority, application Germany, Aug. 23, 1975, 2537665

Int. Cl.[2] D06B *23/18*

U.S. Cl. 68—5 E **5 Claims**



1. A sealing device for the inlet and outlet of a continuous textile material in a dry or wet state, and in the form of an endless rope, into and from a pressure tight container that is under high pressure conditions, comprising at least one pressure lock including a sealing element formed of an elastic material, said sealing element having a shell configuration comprising two frustro-conical sections of different height having complementary small base portions located adjacent each other to define a narrow neck in the sealing element and larger, different diameter base portions remote from said neck on opposite ends of the sealing element with one of said larger diameter base portions freely protruding into the pressure container, said sealing element having an internal surface lined with a smooth layer, and the inner diameter of said neck of the sealing element being selected to be substantially equal to the diameter of the rope whereby the shell of the sealing element is tightly pressed from all sides by the pressure in said container

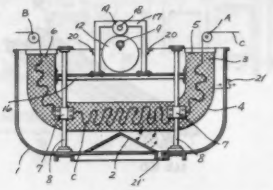
to engage the inner surface of the sealing element at said neck with the rope to form a pressure seal therebetween.

4,047,404

PRINTED FABRIC WASHING APPARATUS

Takashi Hayashi, Kyoto, Japan, assignor to Tanno Senshoku Kogyo Co., Ltd., Kyoto, Japan

Filed Nov. 17, 1976, Ser. No. 742,616
Int. Cl.[2] D06B 3/20
U.S. Cl. 68—152 **1 Claim**



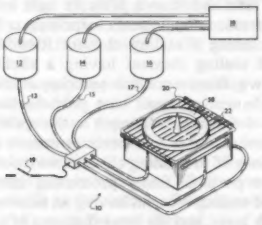
1. A printed fabric washing apparatus comprising a U-shaped tunnel-like cage of rectangular cross-section formed of a screen material, said cage having a middle linear portion and upwardly curving vertical portions positioned at opposite ends of said middle linear portion to define the U-shape, a liquid containing tank in which said cage is disposed with said middle linear portion lying below said liquid and with its upwardly curving vertical portions located at opposite ends of said tank and providing introducing and withdrawing ports for, respectively, introducing and withdrawing a printed fabric to and from said cage, a ridge-like projection mounted centrally on the bottom of said tank transversely below said linear portion of said cage, coupling rods attached to the opposed inner sides of said vertical portions of the cage and extending horizontally with the longitudinal axis of said linear portion, U-shaped suspension frames each fixed to one of said coupling rods at the middle of the respective rod, each frame having a loose pulley attached thereto, a rotatable shaft installed on posts and extending over said tank above the middle of opposite lateral walls of the tank and at right angles with the longitudinal axis of said linear portion of the cage, and eccentric wheels fixed on said rotatable shaft with each wheel carrying thereon a respective loose pulley to suspend the cage, a motor operatively associated with said rotatable shaft to rotate the shaft and eccentric wheels such that the rotation of the eccentric wheels causes said cage to move up and down within the tank.

4,047,405

APPARATUS FOR APPLYING DYE LIQUOR TO KNIT/DEKNIT TUBULAR ROLLS

Edward J. Dombrowski, Asheboro, N.C., assignor to Champagne-Dye Works, Asheboro, N.C.

Filed Oct. 13, 1976, Ser. No. 732,091
Int. Cl.[2] D06B 1/02, 11/00
U.S. Cl. 68—205 R **6 Claims**



1. Apparatus for applying dye to spaced positions on the side surfaces of a roll of knit fabric which is to subsequently be deknit to form a crimped yarn comprising:

a. a dye fixture including support means for holding at least one of said rolls in close relation thereto;

b. a plurality of containers, each adapted to receive a supply of dye liquor therein;

c. a supply line extending from each of said containers to said dye fixture;

d. means for applying pressure to the interior of each of said containers to force the dye liquor out into said supply lines under pressure;

e. said dye fixture comprising a plurality of tubular elements arranged in a horizontally planar configuration and having spaced dye outlet openings in the upper surface thereof, and means for connecting each of said tubular element to one of said supply lines for selectively receiving dye under pressure therefrom; and

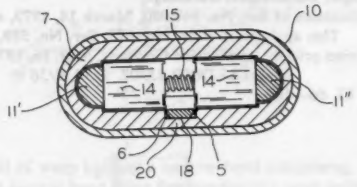
f. valve means selectively operable for opening said supply lines and causing a plurality of spurts of dye liquor to be emitted upwardly through the openings in said tubular elements.

4,047,406

ANTI-RAP MOUNTING FOR PERMUTATION LOCK ELEMENTS

Daniel J. Foote, Wauwatosa, Wis., assignor to Master Lock Company, Milwaukee, Wis.

Filed Sept. 3, 1976, Ser. No. 720,191
Int. Cl.[2] E05B 37/04
U.S. Cl. 70—25 **1 Claim**

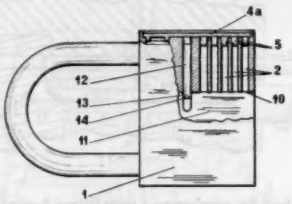


1. In a permutation lock, a body, a bolt housing lining a portion of said body, a shackle movable in the body including the lined portion of the latter and having a closed position and a projected open position, a pair of separate locking bolts mounted within a cavity in the lined portion of the body in a manner as to slide in opposite directions into locking engagement with the legs of the shackle when the latter is in its closed position, resilient means normally urging said locking bolts in opposite directions into releasable locking engagement with the shackle legs, a blocking lever separate from the locking bolts pivotally mounted within the body and having a reduced blocking finger at one end movable in a path at right angles to the axis of the locking bolts into locking position between the inner ends of said locking bolts to prevent undesired retraction thereof out of locking position relative to the shackle legs, said blocking finger being accommodated by a cavity within the lined portion of the lock body whose forward end portion communicates with an alined recess therefor only in the inner face portion of the bolt housing, the forward end portion of the last-mentioned cavity being closed by a rigid bridge in said portion of the bolt housing so that the last-mentioned cavity can snugly receive the blocking finger and positively limit its path of travel within the last-mentioned cavity and relative to the spaced inner ends of the locking bolts a distance only infinitesimally greater than the breadth of said blocking finger so that unauthorized raps imposed on a portion of the lock body cannot cause surreptitious oscillations of said blocking finger sufficient to free it from the locking bolts.

4,047,407
PADLOCK

Feliciano Aranzabal, Mondragon, Spain, assignor to Feliciano Aranzabal Y Cia, S.A., Spain

Filed Jan. 13, 1976, Ser. No. 648,753
Claims priority, application Spain, Feb. 3, 1975, 209606
Int. Cl.[2] E05B 67/02
U.S. Cl. 70—52 6 Claims

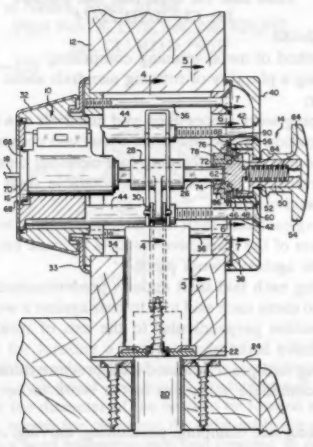


1. An improved padlock comprising:
a padlock body having a cylindrical bore passing therethrough, said bore being adapted to receive a lock plug;
said padlock body also including a plurality of tumbler receiving passages arranged in a predetermined array and extending from said bore to one side of said body, each of said passages having a predetermined cross-section;
a lid to cover said one side of said padlock body, said lid comprising a plate having a sufficient size to extend past and cover all of said passages;
a first plurality of lugs projecting from said lid in an array corresponding to said array of said passages, each said lug corresponding to a different said passage and having a cross-section approximately equal to that of said corresponding passage, the length of each lug being less than the length of its corresponding passage whereby said lugs do not extend into said cylindrical bore.

4,047,408
LOCK MECHANISM

Eddie D. Johns, 2680 SE. Spruce St., Hillsboro, Oreg. 97123; Robert E. Cummings, 45 Eagle Crest Drive, Lake Oswego, Oreg. 97034, and Edgar W. Pearl, 18620 SW. Aloha Court, Aloha, Oreg. 97005

Filed Dec. 8, 1975, Ser. No. 638,609
Int. Cl.[2] E05B 65/06
U.S. Cl. 70—129 13 Claims

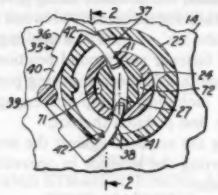


1. A lock mechanism having a forward end and a reverse end, said mechanism comprising a lock cylinder at the forward end thereof, a manually engageable knob on the reverse end of the lock mechanism for positioning on the opposite side of a door from said cylinder, and a bolt operated by rotation of said cylinder,
releasably engageable means normally intercoupling both said cylinder and said knob in operating relation to said bolt,
and means selectively operable from said forward end of said lock mechanism for positioning said releasably engageable means in non-coupling relation so that said bolt cannot be operated from said knob while maintaining said cylinder in operable relationship with said bolt.

4,047,409
KEY CONTROLLED LOCK

David W. Fuller, Rosemead, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.

Filed Sept. 9, 1976, Ser. No. 721,667
Int. Cl.[2] E05B 29/06
U.S. Cl. 70—356 8 Claims



1. A key controlled lock comprising
a base structure forming a cylindrical bearing,
an actuator rockable in said bearing,
said actuator having a keyway extending at least substantially diametrically across one end portion thereof,
a flexible locking element having a pair of locking fingers normally engaging in the opposite sides of said keyway to prevent rocking of said actuator member,
means supporting said locking member eccentrically of said bearing,
said last mentioned means preventing movement of said locking member about the axis of said bearing,
a key insertable endwise in said keyway,
said key having camming means thereon effective to cam said locking fingers out of said keyway and to flex said locking element upon insertion of said key in said keyway to permit rocking of said actuator member by said key.

4,047,410
MECHANISM FOR RELEASING DEVICE ATTACHING AN ANTI-THEFT MONITOR TO MERCHANDISE

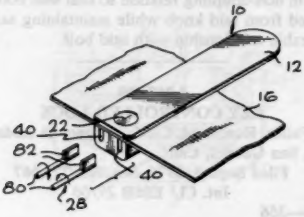
Leo R. Close, Granada Hills, Calif., assignor to Mrs. Lawrence Israel, Los Angeles, Calif.

Division of Ser. No. 563,480, March 31, 1975, Pat. No. 3,973,418. This application May 17, 1976, Ser. No. 687,014
Int. Cl.[2] E05B 19/14
U.S. Cl. 70—401 1 Claim

1. A mechanism for releasing a device for attaching a monitor to an article of merchandise, the attaching device including a tack having a shank and a keeper for receiving the shank, the keeper enclosing a fastener having opposed elements for gripping the shank, displacement of the opposed gripping elements toward releasing positions permitting withdrawal of the shank from the keeper, the keeper further having a pair of openings for receiving key means adapted to engage and displace the fastener gripping elements to the shank-releasing position, the releasing mechanism comprising:
base means;

a pair of horizontal, parallel spindles journalled for rotation in the base means, the spindles being coupled for counter-rotation and spaced apart a distance equal to the distance between the pair of openings in the keeper, the spindles further having outer end portions comprising key means including tabs adapted to engage the fastener gripping elements and displace the gripping elements to the shank-releasing position upon rotation of the spindles;

an actuator supported by the base means and coupled to



rotate the spindles, the actuator being pivotally mounted on the base means for movement between a first position in which the tabs are oriented in a non-engaging position relative to the fastener and second position in which the tabs are oriented in a fastener-engaging position, the base means further including a stop for engagement by the actuator in the first position thereof;

means for biasing the actuator against the stop; and

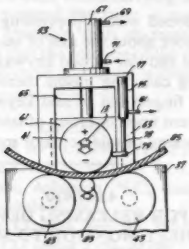
means for supporting the monitor in operative relationship to the key means.

4,047,411

NUMERICALLY CONTROLLED PYRAMID ROLL FORMING MACHINE

Gene B. Foster, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 3, 1977, Ser. No. 756,360
Int. Cl.² B21D *5/14*; G01B *5/20*
U.S. Cl. 72—7 **22 Claims**



17. A method of controlling a pyramid roll forming mechanism having a position controllable upper forming roll such that parts with varying radii contours can be formed, said method comprising the steps of:

continuously producing control signals denoting the desired radii of a part as it is being contour formed;

continuously producing feedback signals related to the position of said upper forming roll and, thus, the radii of a part as it is being formed;

continuously comparing said control signals with said feedback signals to produce position error signals; and,

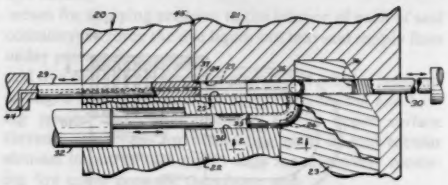
using said position error signals to control the position of said upper forming roll such that said pyramid roll forming machine contour forms said part in accordance with said control signals.

4,047,412

METHOD OF MAKING A PIPE FITTING AND PRODUCT

Marvin E. Holmgren, Elkhart, Ind., assignor to Elkhart Products Corporation, Elkhart, Ind.

Filed Nov. 15, 1976, Ser. No. 741,968
Int. Cl.² B21D *51/16*
U.S. Cl. 72—58 **5 Claims**



1. A method for producing a pipe fitting having at least three legs comprising the steps of:

providing a tube of malleable metal having one end closed and a diameter to wall thickness ratio in the range of 5–30,

substantially filling said tube with a constant volume filler material,

confining said tube in die means having relief zones on each side of said tube and intermediate the ends adapted to develop legs having a length to diameter ratio of more than 3, and

deforming said tube in a single step by exerting pressure at both ends thereof to extrude the same from both ends simultaneously while continuously maintaining said filler material at constant volume to provide at least three legs thereby wherein the variation in wall thickness throughout said fitting is less than about 10%.

4,047,413

AUTOMATIC METAL-SPINNING METHOD

Burton F. Lewis, Bear Hill Road, and Alan Y. Lewis, Walnut St., both of Hillsboro, N.H. 03244

Filed Jan. 16, 1976, Ser. No. 649,907
Int. Cl.² B21D *22/14*
U.S. Cl. 72—83 **4 Claims**

1. A method of metal spinning comprising:

a. rotating a plurality of rotating mandrels about a common center;

b. clamping work pieces upon said mandrels as a function of the position of said mandrels about said common center;

c. positioning a metal forming tool mounted on a cross arm of a respective reciprocatable rotatable shaft relative to each said mandrel;

d. moving each said shaft in a direction parallel to the axis of rotation of the respective mandrel to cause each said tool to bear against a work piece.

e. rotating each said shaft under a predetermined load pressure to cause each said tool to bear against a work piece in a direction perpendicular to the axis of rotation of the respective mandrel;

f. varying said predetermined load pressure during spinning to accomodate variations in the work to be performed; and,

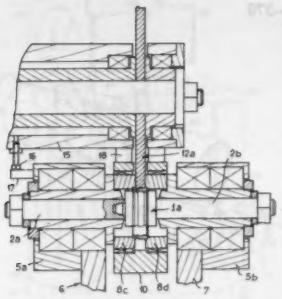
g. effecting said clamping, positioning, moving, rotating and varying as a function of the position of said mandrels about said common center.

4,047,414

BEARING RACE ROLLING DEVICE

Gerard Druge, and Roger Troccaz, both of Annecy, France, assignors to Societe Nouvelle de Roulements, Annecy, France

Filed Nov. 4, 1976, Ser. No. 739,014
Claims priority, application France, Nov. 6, 1975, 75.33940
Int. Cl.² B21H 1/12
U.S. Cl. 72—91 6 Claims



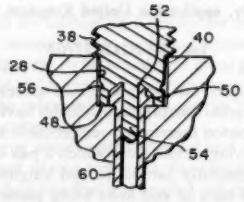
1. Device for rolling rolling-contact bearing races from a blank by means of a die and shaping wheels comprising an inner roller for obtaining the internal profile of the race in the die from which it is separated to permit a possible extrusion of the excess material of said blank, said inner roller being mounted on a shaft rotating in a fixed support in its operative position; an outer wheel having an outer working profile for shaping part of the external profile of the race against the action of the inner roller; said die being divided in the axial direction into two separable sections disposed on either side of said outer wheel in a die support, said die support being mounted for movement across said shaft and being responsive to the thrust from a member supporting said outer wheel during the rolling operation; and said sections constituting a cavity of which the profile is designed for shaping the portions of the outer profile of the race which are adjacent to those shaped by said roller, the two die sections being fitted for free rotation in said die support.

4,047,415

APPARATUS FOR SHAPING THE END OF A HOLLOW TUBE

Warren Joseph Crane, 161 Boden Lane; Russell Bancroft Collins, 17 Hillcrest Ave., and Charles Warren Crane, 161 Boden Lane, all of Natick, Mass. 01760

Filed Nov. 6, 1975, Ser. No. 629,557
Int. Cl.² B21D 19/02
U.S. Cl. 72—125 1 Claim



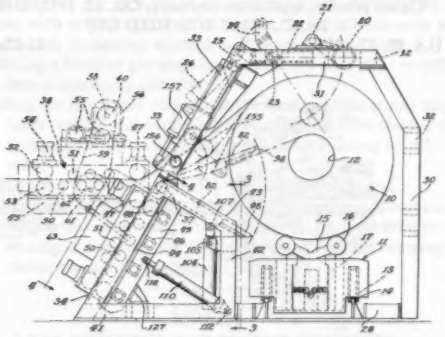
1. A tool for forming a head at one end of a hollow tube made of a deformable material, said tool comprising an anvil containing a cylindrical opening of predetermined diameter greater than the diameter of the head to be formed at the end of the tube, means for clamping the tube with the end to be formed into a head extending into said opening in concentric relation thereto, a die supported in axial alignment with the cylindrical opening in the anvil for rotation and rectilinear movement toward the cylindrical opening, a cylindrical tip at the leading end of the die, interengageable within the cylindrical opening by movement of the die toward the cylindrical opening, said cylindrical opening having a predetermined depth and having at its bottom a flat annular surface at right angles to the axis of the cylindrical opening, and said cylindrical tip having a flat end surface at right angles to the axis of the die for engagement with the flat annular surface at the bottom of the cylindrical opening and containing at said end an axially extending cylindrical pilot member of a diameter corresponding to the inside diameter of the tube for reception within the tube as the die is advanced into the cylindrical opening, and surrounding said pilot member an annular opening comprising an axially extending cylindrical portion at the end face, inwardly of the cylindrical portion a frustoconical portion and at the inner end of the frustoconical portion an annular portion, screw means mounting the die for movement toward the cylindrical opening in the anvil to force the cylindrical tip into the cylindrical opening into engagement with the end of the tube and by a combination of rotation and rectilinear movement, reform the metal of the wall while the latter is supported internally by the pilot member so as to cause the metal of the wall of the tube to conform in solid section to the annular space surrounding the pilot member.

4,047,416

UNCOILING AND STRAIGHTENING APPARATUS FOR STRIP MATERIAL

Kenneth C. Johnson, Des Plaines, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed Oct. 14, 1976, Ser. No. 732,324
Int. Cl.² B21D 1/02
U.S. Cl. 72—183 11 Claims



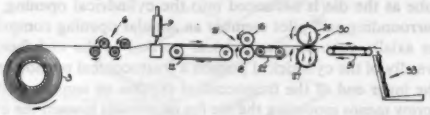
1. In uncoiling and straightening apparatus for strip material, the combination with frame structure, of means for supporting a coil of strip material in a manner permitting rotation of the coil, a straightening and feeding machine located on the unwinding side adjacent the coil, said straightening and feeding machine including a pair of pinch rolls at respective ends and a plurality of straightening rolls located between and, when operative, receiving the strip material at one end as it unwinds from the coil and ejecting the same at its other end as a processed relatively flat and straight strip of material, means provided by the frame structure for pivotally mounting the straightening and feeding machine on a horizontal axis, whereby the said machine may have movement to and from inclined and horizontal positions, and power means for moving the machine on said axis into and from said positions.

4,047,417

DEEPLY EMBOSSED SHEET PRODUCT AND METHOD AND APPARATUS FOR THE PRODUCTION THEREOF

Nathan Oser, Perrineville, and Edmund John Niedzinski, Somerville, both of N.J., assignors to Johns-Manville Corporation, Denver, Colo.

Division of Ser. No. 622,930, Oct. 16, 1975, abandoned, which is a continuation of Ser. No. 521,829, Nov. 7, 1974, abandoned.
This application Oct. 26, 1976, Ser. No. 735,642
Int. Cl.[2] B21D *22/08*
U.S. Cl. 72—185 8 Claims



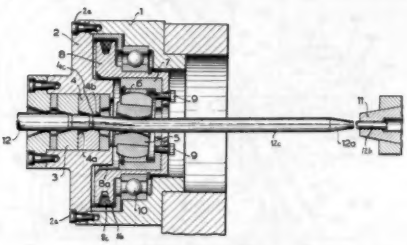
1. Apparatus for the deep embossment of single sheets of sheet material comprising a first set of rolls, each of said rolls in said first set having an embossment pattern suitable for embossment of a small scale relief pattern across the entire surface of each of said sheets, and a second set of rolls, each of the rolls in said second set having a surface pattern suitable for embossment of deep protuberances in each of said sheets in a superimposed relationship to said small scale relief pattern.

4,047,418

COMBINED DRAWING AND STRAIGHTENING MACHINE FOR METALLIC TUBES OR RODS

Ralf Fangmeier, and Alfons Goeke, both of Solingen, Germany, assignors to Kieserling & Albrecht, Solingen, Germany

Filed Sept. 24, 1973, Ser. No. 399,820
Claims priority, application Germany, Oct. 12, 1972, 2249994
Int. Cl.[2] B21C *1/16;* B21D *3/00*
U.S. Cl. 72—278 11 Claims



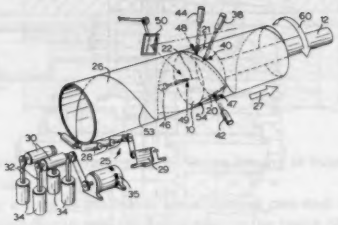
1. In a machine for simultaneous reducing and straightening of elongated tubular or rod-shaped metallic workpieces, a combination comprising a frame; a reducing die mounted in said frame and having a reducing opening for workpieces and a surface surrounding said opening, said surface having a throat portion and an outlet portion which is tapering counter to the direction of the lengthwise movement of workpieces through said die an annular straightening tool movably installed in said frame downstream of said die and having a passage for workpieces; and means for moving said straightening tool relative to said frame so that the axis of said passage orbits about the axis of said opening whereby a workpiece moving lengthwise through said die and said straightening tool is flexed in a plurality of directions in the entire region extending from said die to said straightening tool.

4,047,419

METHOD AND APPARATUS FOR EXPANDING SPIRALWELD PIPE

Paul H. Hookings, Ridgeville; Harry C. Wade, and Phillip Deijs, both of Welland, all of Canada, assignors to The Steel Company of Canada, Limited, Hamilton, Canada

Filed June 23, 1976, Ser. No. 698,964
Claims priority, application Canada, Apr. 30, 1976, 251515
Int. Cl.[2] B21B *17/02*
U.S. Cl. 72—370 7 Claims



1. A method of expanding a spiralweld pipe having transverse welds at intervals, comprising the steps:

supporting at a fixed location an expander head having a helically arranged recess matching the helical weld of the pipe, and at least one further recess disposed so as to be capable of alignment with a transverse weld of the pipe,

sequentially and incrementally advancing the pipe around the expander head in the direction of the pipe axis through a plurality of stationary locations at which movement is arrested, the movement of the pipe between each sequential pair of locations including both axial and rotational motion such that the helical weld tracks in registry with said recess, the arresting of pipe movement being accomplished such that whenever any part of a transverse weld comes to a halt adjacent the expander head it is in registry with the said at least one further recess, the latter step including the provision of visible indicator means adapted to show at the exterior of the pipe the location of all said recesses, thereby to facilitate the alignment of welds with the respective recesses,

and expanding said expander head against the inside of the pipe at each said stationary location.

4,047,420

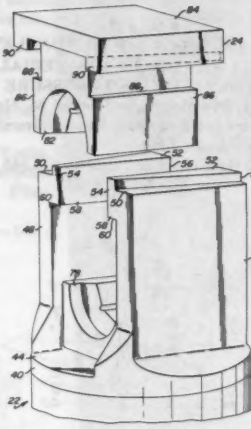
PRESS FOR SWAGING METAL SLEEVES

Hugh Jeremy Willis Edwards, Guisely, England, assignor to CCL Systems Limited, England

Filed Aug. 2, 1976, Ser. No. 710,489
Claims priority, application United Kingdom, Aug. 4, 1975, 32600/75
Int. Cl.[2] B21D *37/02*
U.S. Cl. 72—416 2 Claims

1. A press adapted for use in confined spaces for forming a workpiece, said press comprising a cylinder having a longitudinal axis with a piston therein and reciprocable along said axis, said cylinder having an end from which a pair of arms extend in a direction generally parallel to said longitudinal axis, the outer surface of each of said arms being planar with the distance between the outer surfaces of said arms measured in a direction transverse to said longitudinal axis being less than the outer diameter of said cylinder, said arms also including tapered flanges, a bridging member in the form of a cap having tapered flanges thereon, said cap being detachably secured to said arms, with the flanges of said arms mating with the flanges of said cap, a first die part mounted for said reciprocable movement with said piston and a second die part mounted on said

bridging member, said die parts cooperating together to form said workpiece by movement of said first die part toward said



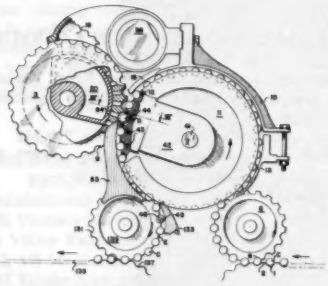
second die part in accordance with the movement of said piston along said axis.

4,047,421

APPARATUS FOR CALIBRATING CIGARETTE INSPECTION DEVICE

Steven F. Spiers; Howard M. Lewis; Gerald A. Kraft, and Arthur R. Pasquine, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,572
Int. Cl.² G01M *3/26*
U.S. Cl. 73—1 R **11 Claims**



1. Apparatus for calibrating a device for testing cigarettes, wherein said testing device including conveyor means for moving the cigarette to be tested past a test point and means disposed at said test point for measuring the air pressure difference across the wrapping of the cigarettes to be tested, the improvement comprising:

a. deforming means disposed adjacent said conveyor means and forward of said test point, for disposing a first and a second defect into first and second test cigarettes, respectively, as carried by said conveyor means, the first and second defects being known, respectively, to provide unacceptable and acceptable pressure differences across the wrappings of the first and second test cigarettes;

b. manifestation means responsive to the outputs of said pressure means, for indicating, respectively, whether the first and second test cigarettes are acceptable; and

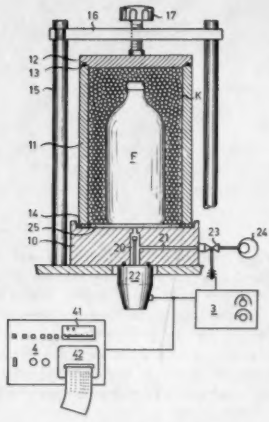
c. sensitivity means for varying the output of said pressure measuring means until said manifestation means provides indications that the first test cigarette is unacceptable and that the second test cigarette is acceptable.

4,047,422

PROCESS FOR MEASURING PERMEABILITY TO GAS OF WALLS AND/OR CLOSURE OF THREE-DIMENSIONAL ENCASING ELEMENTS

Georges H. Lyssy, Rotfluhstrasse 87, CH 8702 Zollikon, Zurich, Switzerland

Filed Apr. 16, 1976, Ser. No. 677,849
Claims priority, application Switzerland, Apr. 18, 1975, 004969/75
Int. Cl.² G01N *15/08*; G01M *3/34*
U.S. Cl. 73—38 **3 Claims**



1. A process for measuring the permeability to gas of the walls and/or the closure of three-dimensional encasing elements, such as packages, bottles or cans, in accordance with a manometric measuring method, said process comprising:

placing a filled or gas encasing element which is to be tested into a measuring chamber;

filling the free space between said encasing element and the inner wall of said measuring chamber with filler elements that protect the encasing element against bursting or inflation;

producing a vacuum in said measuring chamber; and

measuring the time within which a certain pressure increase within said measuring chamber occurs, such time representing a criterion for the leakage rate of the encasing element and/or its closure.

4,047,423

LEAK DETECTOR FOR ENGINE CHAMBERS

Celvie L. Eason, 621 W. 43 Place, Hialeah, Fla. 33012

Filed Sept. 20, 1976, Ser. No. 725,015
Int. Cl.² G01M *3/02*
U.S. Cl. 73—49.8 **1 Claim**

1. A leak detector for detecting leakage in a passageway comprising:

a sealing cap adapted to fit against and seal one end of a passageway, and including means for attaching a rod to said cap and oriented to pass through and extend out of the opposite end of the passageway;

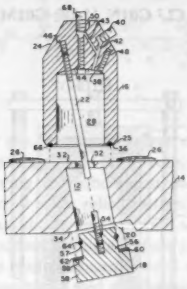
an elongated rod threaded on one end, and including attachment means at the opposite end for attachment to said sealing cap;

a pressure application and measurement enclosure assembly comprising:

a generally cylindrical-shaped chamber having regions with an open end and a closed end, and a sealing ring adapted

to fit around said open end, and sealably coupling said open end to said passageway,

said closed end region of said chamber including a plurality of threaded sockets adapted to receive said threaded end of said rod, one of said threaded sockets being concentric and extending along a line normal to said open end of said chamber, one of said sockets being at an angle of 12° with respect to a line parallel to said axis of said first-named socket, and one of said sockets being positioned at an angle of 14° with respect to a line parallel to said first-named socket,



a pressure gauge coupled to the interior of said chamber, and

pressure valve means coupled to the interior of said chamber for selectively applying gas pressure to and releasing gas pressure from the interior of said chamber;

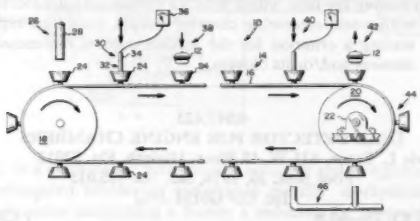
whereby said rod may be passed through said passageway and selectively inserted into one of said sockets at an appropriate angle, and then said rod tightened to effect an aligned seal between said cap and an end of a said passageway.

4,047,424

APPARATUS FOR NON-DESTRUCTIVE LEAK TESTING OF PRIMARY ELECTROCHEMICAL CELLS

Peter H. Rollason, Cayuga, and James M. Williams, Seneca Falls, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sept. 29, 1976, Ser. No. 727,769
Int. Cl.² G01M *3/20*; G01N *31/00*
U.S. Cl. 73—52 **4 Claims**



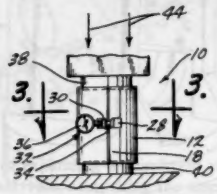
1. An apparatus for leak testing electrochemical cells comprising: conveyor means adapted to move a plurality of test receptacles along a given path; a first work station disposed at a starting point of said path comprising means for dispensing a test fluid into said test receptacles; a second work station adjacent said first work station and downstream therefrom comprising first means for checking at least one particular parameter of said test fluid; a third work station adjacent said second work station and downstream therefrom comprising means for delivering an electrochemical cell into said test receptacle containing said test fluid; a fourth work station disposed downstream from said third work station a digestion distance comprising a second means for checking said at least one particular parameter of said test fluid; means for comparing said first and second checks to determine if said cell leaked; and means for removing said cell.

4,047,425

TESTING DEVICE FOR MEASURING LATERAL PRESSURE INDUCED ON A MATERIAL BY A VERTICAL APPLIED PRESSURE

Richard L. Handy, Des Moines, and James M. Hoover, Ames, both of Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Dec. 17, 1975, Ser. No. 641,545
Int. Cl.² G01N *3/08*
U.S. Cl. 73—94 **10 Claims**



1. A testing device to measure the lateral pressure induced on a material by a vertical applied pressure, said testing device comprising in combination,

a material holding receptacle which is capable of lateral expansion in response to a vertical applied force on a material contained in said receptacle, and a sensing means positioned on said receptacle to sense the amount of lateral expansion of said receptacle,

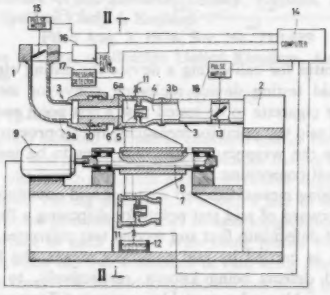
said cylindrical sleeve having a slit along its entire length parallel to the longitudinal axis of said sleeve.

4,047,426

SONIC NOZZLE APPARATUS IN A CARBURETOR FLOW TESTING MACHINE

Iwao Maruyama, Kawagoe, and Shigeo Kanai, Sayama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 30, 1976, Ser. No. 710,242
Claims priority, application Japan, Aug. 1, 1975, 50-105738
Int. Cl.² G01M *15/00*
U.S. Cl. 73—118 **9 Claims**



1. In a sonic nozzle apparatus in a machine for testing flow in a carburetor connected to a suction pressure source: measuring passage means connecting the carburetor to the suction pressure source, said measuring passage means comprising a first passage connected to the carburetor, a second passage connected to the suction pressure source, said first and second

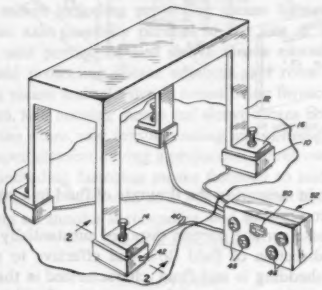
passages defining a spaced cutout portion therebetween, a plurality of tubular nozzle chambers, each nozzle chamber including a respective sonic nozzle therein and upstream and downstream chamber portions on opposite sides of said sonic nozzle, and means for selectively introducing one of said nozzle chambers into said cutout portion to establish communication between said first and second passages.

4,047,427

LOAD-SENSING AND ADJUSTING METHOD FOR OPERABLE MACHINES

Sheldon E. Young, Western Springs, Ill., assignor to Vibro/Dynamics Corporation, LaGrange, Ill.

Filed Jan. 26, 1976, Ser. No. 652,203
Int. Cl.[2] G01L *5/00*
U.S. Cl. 73—141 A 2 Claims



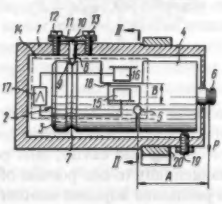
1. The method of optimizing the weight distribution, balance and performance of an operable machine which comprises mounting same on a plurality of height-adjustable, load-indicating, vibration-isolating supports and thereafter selectively adjusting the height of each such support while observing indications of load thereon so as to equalize weight distribution, then placing such machine in operation, observing variations in load indications during such operation and selectively adjusting the height of any such supports as necessary to distribute weight for optimum stability consonant with the cyclical dynamics during operation of such machine.

4,047,428

FORCE MEASURING TRANSDUCER WITH FREQUENCY OUTPUT SIGNAL

Valentin Mikhailovich Karpov, Kolomensky prospekt, 7, korpus 1, kv. 50; Vladimir Rezhevich Santo, Varshavskoe shosse, 10, kv. 137; Viktor Yakovlevich Yanovsky, Kostanaevskaya, 23, korpus 2, kv. 14; Anatoly Ivanovich Mikhailov, ulitsa Obrucheva, 28, korpus 2, kv. 154, and Mikhail Fedorovich Belyaev, prospekt Vernadskogo, 68, kv. 12, all of Moscow, U.S.S.R.

Filed Oct. 24, 1975, Ser. No. 625,514
Int. Cl.[2] G01L *1/10*
U.S. Cl. 73—141 A 6 Claims



4. A force measuring transducer with a frequency output signal, comprising: a casing; an elastic body in the form of a cantilever beam responsive to bending forces and arranged in said casing in spaced relationship therewith; a base on said elastic body and secured in said casing; a working member on said elastic body attached to said base by flexible joint and subjected to the action of a force; an oscillating element constructed as a single unit with said working member and having an oscillation frequency depending upon the magnitude of said force; an electromechanical self-excited oscillator with resonator comprising said oscillating element; at least three supports to secure said base of said elastic body in said casing and to limit the transfer of oscillatory energy from the elastic body to the other elements of the transducer; one tapered end of each said support bearing up against the surface of said base; the other end of each said support being joined to said casing, said working member including said cantilever beam for changing the stresses in said oscillating element in response to the action of said force.

4,047,429

METHOD OF TESTING GLASS FIBER COATING COMPOSITIONS

Norman G. Bartrug, Allison Park, and Donald L. McDaniel, Lower Burrell, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 587,471, June 16, 1975, which is a continuation of Ser. No. 475,705, June 3, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,322
Int. Cl.[2] G01N *3/08*
U.S. Cl. 73—150 R 7 Claims

1. In the method of testing an aqueous admixture of a coating composition to be used for coating glass fibers used to reinforce elastomers, the improvement comprising:

spraying an amount of said admixture onto a surface, said surface being at a temperature greater than 120° F., the amount of said admixture forming a base film of less than about 0.7 mil thickness, the adhesion between said surface and said film being less than the cohesion within said film;

spraying a plurality of additional coats of said admixture over said base film, each of said additional coats imparting a coat thickness of less than about 0.7 mil, to form a continuous, uniform final film of greater than 4 mils thickness which is substantially water free, removing said final film from said substrate;

heating said final film with pressure to cure said film;

preparing test samples from said film; and

testing said sample for strength and percent elongation.

4,047,430

METHOD AND APPARATUS FOR LOGGING EARTH BOREHOLES USING SELF-CONTAINED LOGGING INSTRUMENT

Jorg August Angehrn, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 682,940, May 3, 1976. This application Aug. 2, 1976, Ser. No. 710,974
Int. Cl.[2] E21B *47/00*
U.S. Cl. 73—151 8 Claims

1. Apparatus for investigating the formations surrounding an earth borehole, comprising:

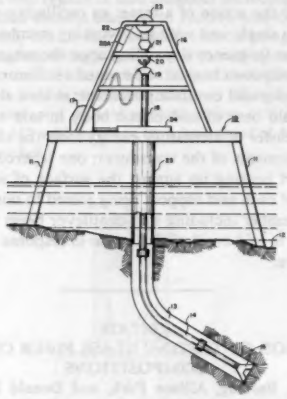
an elongated instrument adapted to traverse an earth borehole;

means within said instrument for measuring at least one characteristic of the formations surrounding said borehole and for generating first signals functionally related to said at least one characteristic;

a variable-output accelerometer within said instrument for generating second signals functionally related to the acceleration of said instrument while traversing an earth borehole;

circuit means within said instrument for translating said

second signals into third signals functionally related to the depth of the instrument within an earth borehole; and



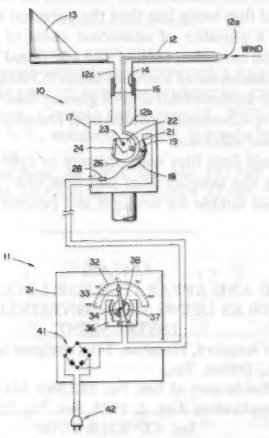
means within said instrument for recording said first and third signals.

4,047,431

WIND CHILL FACTOR INDICATOR

Ronald J. Mulvaney, 1201 W. 5th, Dubuque, Iowa 52001, and Cecil L. Moore, Dubuque, Iowa, assignors to said Ronald J. Mulvaney, by said Cecil L. Moore, a part interest

Filed Aug. 20, 1976, Ser. No. 716,075
Int. Cl.² G01W *1/17*
U.S. Cl. 73—170 R **5 Claims**



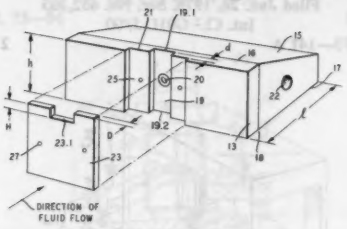
1. A wind chill factor indicator comprising a pitot-static tube mounted out-of-doors for swivel movement and having a vane adapted to face the open end of the tube into the wind, a variable resistor having a wiper arm mounted adjacent the total pressure connection end of the tube, a transducer connected between the pressure connection end of said tube and said wiper arm for converting the pressure in said tube into motion of said wiper arm, a thermistor mounted to be responsive to outdoor ambient temperature, an indicating meter having a coil adapted to induce movement of an indicating needle proportional to electrical current flow through the coil, a source of electrical power, and wiring means connecting said resistor, thermistor, meter coil and source of power, whereby the current flow through said meter coil, and hence the position of said indicating needle, is a function of both the wind velocity and temperature sensed by said tube and thermistor.

4,047,432

BLUFF BODY FLOWMETER INCLUDING SHIELD-CHANNEL ARRANGEMENT

Theodore John Fussell, Jr., Bridgewater Township, Somerset County, N.J., assignor to Neptune Eastech, Inc., Edison, N.J.

Filed Aug. 12, 1976, Ser. No. 713,887
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **9 Claims**



1. For use in measuring the flowrate of fluid in a conduit, a bluff body comprising

a planar base surface portion disposed substantially normal to the direction of fluid flow and effective to produce vortex shedding in said fluid, characterized in that

a fluid flow channel extends from one side of said base portion to the opposite side thereof,

a sensor is located in said channel,

a shield is disposed over said channel and said sensor, and

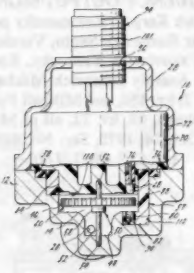
at least that portion of said shield which covers said channel is shorter than the length of said channel so that fluid flow through said channel is unidirectional.

4,047,433

MODULAR VORTEX FLOWMETER

Karnig H. Dabanian, Taylor, Mich., assignor to Cox Instrument Division Lynch Corporation, Detroit, Mich.

Filed May 7, 1976, Ser. No. 684,416
Int. Cl.² G01F *1/06, 1/32*
U.S. Cl. 73—194 C **13 Claims**



1. A vortex flowmeter comprising a body structure having a cavity formed therein, cover means fastened contiguous to said body structure for closing said cavity, inlet port means positioned generally tangentially to one portion of said cavity and outlet port means positioned adjacent another portion of said cavity for permitting the flow of fluid through said cavity from said inlet port means to said outlet port means, said body structure including a first shaft mounting means, a shaft mounted at one end thereof in said mounting means and extending cen-

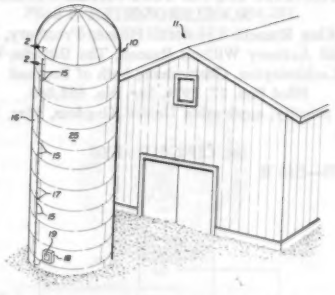
trally through said cavity, a rotor mounted on said shaft and positioned in said cavity and having a plurality of teeth formed thereon, and a modular sensing assembly positioned to sense the passage of said teeth in response to the flow of fluid in said cavity including a second shaft mounting means for mounting the other end of said shaft, said sensing assembly being mounted in said cavity and comprising a light-emitting diode, a phototransistor mounted remote from said light-emitting diode, and sensor housing means and sleeve means forming an integral unit for mounting said light-emitting diode and phototransistor in spaced relation, at least a portion of said rotor being positioned between a portion of said sensor housing means and a portion of said sleeve means for rotation therebetween, one of said phototransistor and said light-emitting diode being mounted in said portion of said sensor housing means and the other of said phototransistor and said light-emitting diode being mounted in said portion of said sleeve means, said sensor sleeve means including projecting means formed to project along an axis generally parallel to the axis of said housing means, said portion of said sleeve means extending radially from said projecting means adjacent said rotor, said sensor housing means and said sleeve means being formed as separate elements, said housing means and sleeve means being fastened, one to the other, said sensor housing means being formed as a cup shaped element having a projection therefrom, said sleeve means including fastening means fastened to said projection, said projection is formed as a cylinder, said fastening means including an annulus surrounding said cylinder.

4,047,434

BIN DEPTH MONITOR

Norman F. Marsh, Auburn, and William T. Eng, Springfield, both of Ill., assignors to Dickey-john Corporation, Auburn, Ill.

Filed Feb. 6, 1976, Ser. No. 655,904
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **14 Claims**



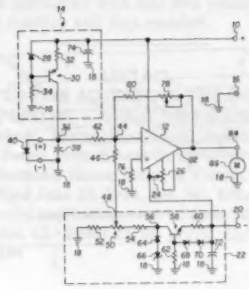
1. A monitor for displaying information related to the depth of material stored in a walled silo or the like, comprising a plurality of sensors in a vertical array along a silo wall, each sensor being adapted to sense the presence or absence of stored material at the sensor, electrical circuit means connected to the sensors for generating a plurality of electrical signals, one of said signals comprising a back plane voltage for a liquid crystal display, and another of said signals comprising a first voltage different from said back plane voltage and corresponding to the presence of stored material for each sensor where material is present and a second voltage the same as the back plane voltage corresponding to the absence of stored material for each sensor where material is absent, and liquid crystal display means connected to the electrical circuit means for receiving said back plane and first and second voltages for providing a display corresponding thereto and to the number of sensors at which the presence of stored material is sensed.

4,047,435

TEMPERATURE MEASURING APPARATUS

John L. Keith, Garland, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 20, 1976, Ser. No. 690,206
Int. Cl.² G01K *7/00*
U.S. Cl. 73—362 SC **1 Claim**



1. Temperature indicating means comprising, in combination:

power supply means including ground means and first and second power terminal means;

constant current transistor means including an emitter resistively connected to said first power terminal means, a base connected through a zener diode to said first power terminal means and a collector;

temperature sensing diode means connected between said collector and said ground means;

temperature compensated constant voltage reference means including output means for supplying a constant voltage reference over a wide range of temperatures with respect to said ground means, said constant voltage reference means including,

constant current second transistor means including an emitter resistively connected to said second power terminal means, a base connected through voltage dropping diode means to said second power terminal means and a collector connected through a series connection of a temperature compensating diode means, and a second zener diode means to said ground means, and

potentiometer means connected between said collector of said second transistor means and said ground means and having a wiper connected to the output means thereof; and

summing means connected to said temperature sensing diode means and to said output means for providing an output indication of temperature of said sensing diode means as a function of the voltage across said sensing diode means as compared to said reference voltage.

4,047,436

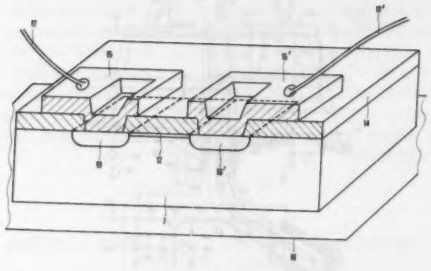
MEASURING DETECTOR AND A METHOD OF FABRICATION OF SAID DETECTOR

Jean Bernard, St-Martin D'Heres; Giorgio Frossati, Grenoble Gare; Georges Guernet, Grenoble; Michel Montier, Meylan; Louise Peccoud nee Toupillier, Claix, and Daniel Thoulouze, Echirolles, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 26, 1972, Ser. No. 220,747
Claims priority, application France, Jan. 28, 1971, 71.02774
Int. Cl.² G01K *7/00*
U.S. Cl. 73—362 SC **21 Claims**

1. A method of fabricating a thermometric measuring detector for use at very low temperatures of the type constituted by the resistance of a given volumn of a doped semi-conductor, comprising: providing a semiconductor monocrystal having

one type of conductivity, forming by ion implantation on a surface of a semiconductor monocrystal a surface region having a predetermined thickness having the same type conductivity as said monocrystal, and having a predetermined concentration of doping ions greater than the concentration of impurities in said monocrystal, forming electrical contacts at the



extremities of said region, and forming a thermally conductive metallic coating on a face of said crystal opposite said surface region bonded to said crystal to be in thermal contact with said crystal.

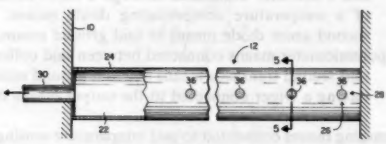
2. A method of measuring temperature comprising fabricating a detector as recited in claim 1 and subjecting said metallic coating to the temperature to be measured.

4,047,437

CONTINUOUS ROW AVERAGE SAMPLING METHOD AND APPARATUS FOR STATIONARY SOURCE GAS STREAMS

Edward F. Brooks, Lawndale, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 20, 1976, Ser. No. 716,317
Int. Cl.² G01N *1/26*
U.S. Cl. 73—421.5 A **4 Claims**



1. A gas sampling probe for continuous row average sampling of a stationary source gas stream comprising:

a tubular body to be placed in sampling position in said gas stream;

said body having a longitudinal passage bounded by a tube wall containing a longitudinal row of sampling ports opening to said passage and an outlet from said passage for connection to gas analyzing means and a vacuum source for evacuating said probe to effect inflow of gas into said probe passage through said ports, mixing of the entering gas within said passage to form composite sample gas, and flow of said composite gas to the gas analyzing means; and

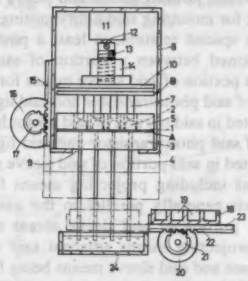
each port containing a separate porous filter through which gas flow occurs to said probe passage and whose pores are sized to produce a pressure drop across the port which is larger by a factor on the order of 10 to 20 than any pressure changes which occur along said port row and is substantially constant along said port row so as to maintain a substantially uniform sample rate along said port row.

4,047,438

LIQUID QUANTITATIVE DISPENSING APPARATUS

Teruaki Sekine, 1-1 Tsukiji 5-chome, Chuo, Tokyo, Japan

Filed Mar. 31, 1976, Ser. No. 672,170
Claims priority, application Japan, Apr. 4, 1975, 50-46509[U]
Int. Cl.² B01L *3/02*
U.S. Cl. 73—423 A **3 Claims**



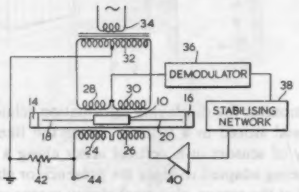
1. Liquid quantitative dispensing apparatus comprising a flexible board-like member having a plurality of cap-like projections arranged in rows lengthwise and crosswise thereon with a small space between each of said projections, a lower board positioned under the said flexible board-like member and having a plurality of aligned pipettes held therein which correspond in number with said projections, a guide board positioned on the said flexible board-like member and having bores to loosely receive said cap-like projections, the said guide board, flexible board-like member and said lower board forming together the main apparatus body, and a keep plate having push bars disposed thereunder so as to be inserted into the said bores of the said guide board to press said cap-like projections.

4,047,439

MAGNETIC LIQUID SUPPORTED LINEAR ACCELEROMETER

Michael King Russell, Lynworth House, Prestbury, Cheltenham, and Anthony William Russell, The Bittams, Crippetts Road, Leckhampton, Cheltenham, both of England

Filed Feb. 17, 1976, Ser. No. 658,866
Claims priority, application United Kingdom, Mar. 26, 1975, 12568/75
Int. Cl.² G01P *15/08*
U.S. Cl. 73—516 R **3 Claims**



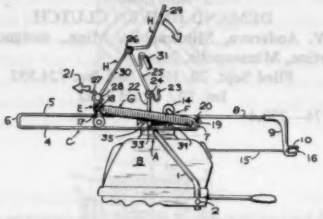
1. A linear accelerometer having a proof mass comprising a permanent bar magnet located in an elongate chamber of length in the direction of its longitudinal axis substantially greater than its width in directions perpendicular to said longitudinal axis and substantially filled with a magnetic fluid, the bar magnet being supported by the magnetic fluid with the magnetic axis of the bar magnet parallel to the longitudinal axis of the chamber, servo means responsive to movement of the bar magnet in the direction of the axis thereof for maintaining the bar magnet in a desired position and means for providing an electrical signal indicative of the force exerted on the bar magnet by the servo means.

4,047,440

STARTER FOR ROPE PULL OUTBOARD MOTORS

Manuel Carriera, 560 Ramos Ave., No. 1, Hayward, Calif. 94544

Filed July 22, 1976, Ser. No. 707,676
Int. Cl.[2] F02N 5/02; F03G 1/00
U.S. Cl. 74—6 4 Claims



1. A starter for a rope pull outboard motor comprising:
a. a pair of spaced apart and parallel guide tracks securable to an outboard motor equipped with a pull cord for starting the motor;
b. a rope pulling member including a trolley movable along said guide tracks, said member having means for gripping the motor pull cord;
c. spring means for moving said rope pulling member for actuating the pull cord for starting the motor;
d. a hand operated toggle mechanism for moving said member for tensioning said spring means and for holding said member in a tensioned condition; and
e. said toggle mechanism being manually freed from said trolley to permit said tensioned spring means to rapidly move said rope pulling member for starting the motor.

4,047,441

MECHANICAL COUNTERBALANCE ASSEMBLY

Richard Webster Kellogg, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 2, 1976, Ser. No. 654,381
Int. Cl.[2] F16H 37/12
U.S. Cl. 74—52 10 Claims

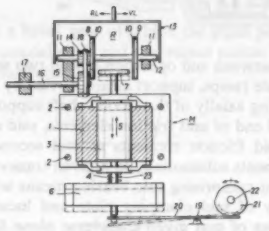
1. A torsional counterbalance assembly for counterbalancing the weight of an object mounted for movement in a vertical direction comprising:
a first rotatable member having a rotational axis and frame means mounting said rotatable member for rotation about its axis,
spring means associated with said first rotatable member for imparting torque to said first rotatable member to rotate said first rotatable member in a first direction and to resist rotation of said first rotatable member in the opposite direction,
a second rotatable member associated with said first rotatable member and mounted for rotation relative thereto, and means associated with said second rotatable member for translating the rotational motion thereof into motion corresponding to the movement of said object,
manually actuated connection means associated with said first and second rotatable members for releasably interconnecting said first rotatable member and said second rotatable member in mutually driving relationship, so that said first rotatable member can rotate independently from said second rotatable member when released from said second rotatable member.
manually actuated locking means associated with said frame means for selectively preventing said second rotatable member from rotating, and
drive means associated with said first rotatable member for manually rotating said first member.

4,047,442

APPARATUS FOR ADJUSTING THE ROTATIONAL SPEED OF A DRIVE MECHANISM

Gottfried Pammer, Maria Enzersdorf, Sudstadt, and Rudolf Kvasnicka, Baden, both of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed June 24, 1976, Ser. No. 699,458
Claims priority, application Austria, June 26, 1975, 4929/75
Int. Cl.[2] F16H 15/08, 15/10, 15/12
U.S. Cl. 74—194 6 Claims



1. Apparatus for adjusting the rotational speed of a drive mechanism of the type incorporated in a movie projector or the like, comprising, in combination, a drive motor having a stationary mounted stator and a rotor including a shaft rotating in one direction with said rotor and stator arranged for relative movement, a rotatably mounted drive shaft, at least one friction disc mounted on said drive shaft,
a friction wheel mounted on said rotor for movement by said rotor in a radial direction with respect to said friction disc, an adjustment mechanism engageable with said motor shaft in an axial direction for moving said rotor with respect to said stationary stator for driving engagement between said friction wheel and said friction disc in either a first or second radial position with respect to said disc for adjusting the rotational speed of the drive mechanism.

4,047,443

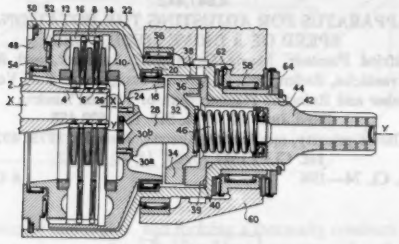
SPEED VARIATOR HAVING FRICTION ELEMENTS

Rene Leveque, Orgeval, France, assignor to Automobiles Peugeot, Paris, France

Filed Nov. 18, 1975, Ser. No. 633,024
Claims priority, application France, Nov. 18, 1974, 74.37872
Int. Cl.[2] F16H 15/14
U.S. Cl. 74—199 11 Claims

1. In a speed variator comprising a housing, a first shaft having a first axis of rotation, a second shaft which is parallel to the first shaft and mounted in the housing and has a second axis of rotation, a clamping plate axially slidably mounted in the housing and coaxial with the second shaft, a cylinder integral with the clamping plate, an assembly of friction elements consisting of a first single series of said friction elements coaxial with and connected to rotate with the first shaft and a second single series of said friction elements coaxial with the second shaft and slidably keyed in said cylinder, the first series of friction elements being interposed between and clampable between the second series of friction elements, said assembly of friction elements having a first end and a second end which

second end is opposed to said first end and adjacent the clamping plate, means for varying the distance between the two shafts transversely of the shafts, and a coupling device for coupling the clamping plate to the second shaft and rendering the clamping force exerted by the clamping plate on the friction elements proportional to the torque transmitted to the second shaft and comprising two sets of cooperative conjugate ramps respectively associated with the clamping plate and the second shaft, said clamping plate being rotatable relative to the second shaft to an extent sufficient to allow relative rotary



movement between and operation of said two sets of cooperative conjugate ramps, support means carried by and supported by the housing axially of the second shaft supportingly engaging said first end of said friction elements, said clamping plate engaging said friction elements at said second end of said friction elements substantially in a given transverse plane; the improvement comprising two bearing means which are space apart axially of said clamping plate and located axially on opposite sides of said given transverse plane for guiding the clamping plate in the housing.

4,047,444

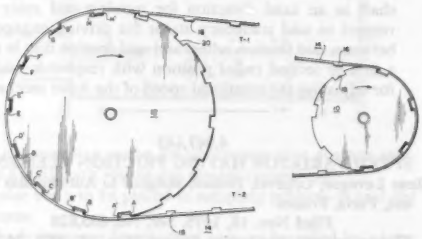
SYNCHRONOUS BELT AND PULLEY DRIVE

Joseph O. Jeffrey, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 10, 1976, Ser. No. 722,237

Int. Cl.[2] F16H *7/00*; F16G *1/28*

U.S. Cl. 74—229 **11 Claims**



1. A synchronous belt and pulley drive comprising:

a driveR pulley;

a driveN pulley;

said pulleys being spaced from each other and each having a plurality of spaced tooth-gaps;

a belt engaging the pulleys and having spaced teeth which are accommodated by the tooth gaps of said pulleys;

the drive between said driveR pulley and said driveN pulley being substantially by friction of the belt thereon, the relationship of belt teeth and the pulley toogh gaps insuring synchronization of the drive between the pulleys and substantially eliminating slippage of the belt on the pulleys;

the pitch of the driveR pulley substantially matching the pitch of the belt under a first tension; and

the pitch of the driveN pulley substantially matching the pitch of the belt under a second and different tension.

4,047,445

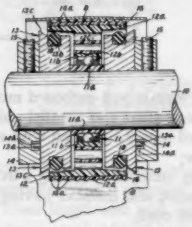
DEMAND DRIVEN CLUTCH

Conrad V. Anderson, Minneapolis, Minn., assignor to Pako Corportion, Minneapolis, Minn.

Filed Sept. 20, 1976, Ser. No. 724,592

Int. Cl.[2] F16H *7/22*

U.S. Cl. 74—230.4 **6 Claims**



1. A demand driven clutch assembly comprising:

a pulley member including an outer rim, an inner sleeve positioned in spaced relation within the outer sleeve and a plurality of yieldable resilient vanes which normally maintain said rim and sleeve in concentric relation but are yieldable to external force to permit said rim to shift radially inwardly,

said inner sleeve being adapted to be journaled for free rotation on a rotary drive shaft, and

said outer rim extending axially outwardly beyond said inner sleeve to provide an inner friction clutch driving surface,

a pair of driving members including:

a driving collar adapted to be fixed to the drive shaft in axially spaced relation to said inner sleeve,

a driving hub clutch element interposed between said collar and said inner sleeve and having a central axial opening to receive shaft, and

a plurality of connecting elements extending between said collar and said hub in parallel relation to the axis of said central opening to provide a driving connection between said hub and said collar,

the outer circumferential surface of said hub providing a friction driving clutch surface for driving engagement within the inner clutch surface of said rim when said rim is shifted radially inwardly by an external force applied to the outside thereof.

4,047,446

ENDLESS POWER TRANSMISSION BELT

Billy L. Speer, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

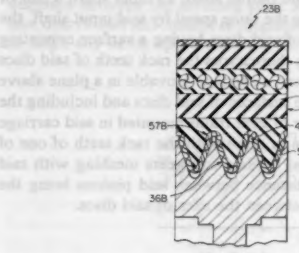
Filed June 14, 1976, Ser. No. 696,108

Int. Cl.[2] F16G *5/00, 1/00*

U.S. Cl. 74—234 **16 Claims**

1. An endless power transmission belt having a compression section and a plurality of longitudinally extending ribs comprising said compression section and defining the inside surface of said belt, each pair of immediately adjacent ribs having a space therebetween which when viewed in cross section has a

substantially U-shaped peripheral outline, said spaces allowing wear of said ribs while assuring apexes of sheave projections



operatively engaging said belt are maintained spaced from said belt with normal wear of said ribs thereby prolonging belt life.

4,047,447

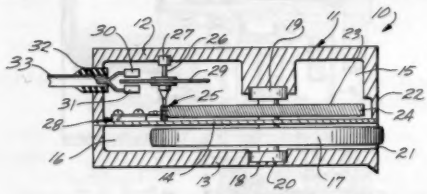
DUAL RATE BIAS SPRING FOR ANTIBACKLASHING GEARS

Irven H. Culver, Playa Del Rey, and Oleg Szymber, Rancho Palos Verdes, both of Calif., assignors to Belrico, Inc., San Lorenzo, P.R.

Continuation-in-part of Ser. No. 576,883, May 12, 1975, abandoned. This application Apr. 19, 1976, Ser. No. 678,316

Int. Cl.[2] F16H *55/18, 57/00*

U.S. Cl. 74—409 **22 Claims**



15. A biasing mechanism for variable center distance gear trains in which a driven gear is engageable with a drive gear and is rotatable about an axis which, at least adjacent the drive gear, is not fixed in position radially of the drive gear, the mechanism comprising spring means engageable with the driven gear for biasing the driven gear substantially radially toward the drive gear into mesh therewith with a force corresponding to a desired intertooth loading force between the teeth of the drive and driven gears during conditions of substantially normal use, and stop means effectively cooperable with the driven gear for limiting movement of the driven gear in a direction radially away from the drive gear to an amount of movement less than the amount required to permit the driven gear to unmesh from the drive gear.

4,047,448

ROBOT HEAD

Pierre Pardo, and Francois C. Pruvot, both of Meudon la Foret, France, assignors to SOFERMO, Meudon la Foret, France

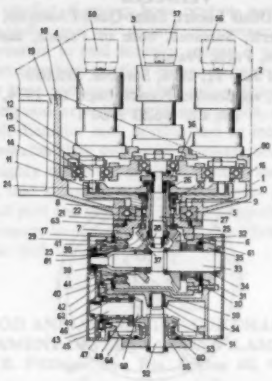
Filed May 12, 1976, Ser. No. 685,927

Claims priority, application France, May 15, 1975, 75.15127

Int. Cl.[2] F16H *1/14*

U.S. Cl. 74—417 **7 Claims**

1. Robot or manipulator head comprising a control casing and at least two perpendicular shafts and corresponding external members rotatably driven from driving servo motors, one of said perpendicular shafts being rigid with one of said members supporting the other perpendicular shaft, said servo motors fixedly mounted in said control casing being drivingly connected to at least two coaxial shafts, while at least one of said perpendicular shafts is driven from one of said coaxial-



shafts through a bevel gear of which the input pinion is rigid with said one coaxial shaft and the output pinion is rigid with said one perpendicular shaft.

4,047,449

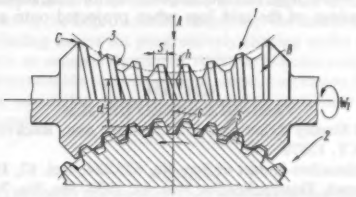
GLOBOID WORM GEARING AND METHOD OF MAKING GLOBOID WORM THEREOF

Valentin Alexeevich Popov, ulitsa Tsjurupy, 6, korpus 4, kv. 57, Moscow, U.S.S.R.

Filed Jan. 29, 1976, Ser. No. 653,454

Int. Cl.[2] F16H *55/04, 1/16, 1/20*

U.S. Cl. 74—458 **4 Claims**

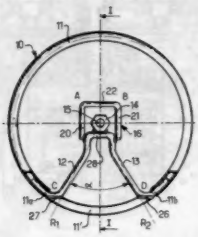


1. A globoid worm gearing comprising: a cylindrical worm-wheel having a plurality of teeth with side surfaces, a globoid worm having a thread with side surfaces and a throat, the side surfaces of the thread of said globoid worm shaped to envelop the side surfaces of the teeth of said cylindrical worm-wheel, means for meshing said worm-wheel with said globoid worm and for engaging the thread of said globoid worm with the teeth of said cylindrical worm-wheel such that said worm thread makes a linear contact throughout the entire side surface of said worm-wheel teeth wherein the contact surface of the globoid worm gearing comprises the contact surface of the cylindrical worm-wheel; the contact lines of the cylindrical worm-wheel envelop the entire side surface of the worm-wheel teeth, while the contact lines of the globoid worm gearing occupy only the medium portion of the tooth side surface, said contact lines on the worm-wheel teeth intersect on the side surface of the working wheel teeth during successive engagement of the globoid worm thread with the teeth of the cylindrical worm-wheel.

4,047,450
SAFETY STEERING-WHEELS FOR AUTOMOTIVE VEHICLES

Jean-Guy Pierre Denis Lecart, Saint-Quen-l'Aumone, and Jean Claude Amalberti, Suresnes, both of France, assignors to Chrysler France, Paris, France

Filed July 11, 1975, Ser. No. 595,080
Claims priority, application France, Sept. 16, 1974, 74.31271
Int. Cl.[2] B62D *1/08*
U.S. Cl. 74—552 8 Claims

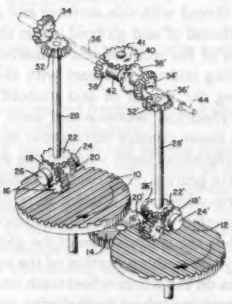


1. Safety steering-wheel including a central hub having a hub axis and a rim situated in a predetermined rim plane located in front of said central hub, the said steering-wheel including only two deformable legs fixed to said rim and inclined rearwardly therefrom toward said hub, with at least one of said legs being fixed to said hub, said legs when projected onto said rim plane being directed substantially along two radii in proximity to one another leaving a greater part of the rim which extends through more than 180° around said axis deprived of any point of attachment with a leg, at least one of said legs and said hub respectively having portions at least one of which is a fixing portion, the said steering-wheel comprising a complementary portion inclined to the axis of the hub, substantially in the shape of a gallows, having a pair of feet at least one of which is fixed near the hub to said fixing portion, and said complementary portion extending well in front of the hub, but behind the rim plane to a side of the hub axis opposite from said steering-wheel legs, said feet respectively forming substantially prolongations of the said legs when projected onto said rim plane.

4,047,451
VARIABLE SPEED DEVICE

Leonard Stanley Ackerman, 355 Lakeview Ave., Rockville Center, N.Y. 11570

Continuation-in-part of Ser. No. 623,524, Oct. 17, 1975, abandoned. This application Nov. 12, 1976, Ser. No. 741,428
Int. Cl.[2] F16H *37/06*
U.S. Cl. 74—665 H 7 Claims

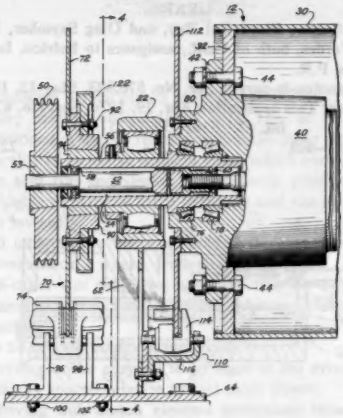


1. A variable speed transmission comprising an output shaft, a planitating gear of a differential gear train driven by two sun gears, said planitating gear being operatively secured to said output shaft to drive said output shaft, an input shaft, a pair of identical discs driven at the same speed by said input shaft, the upper surface of each of said discs having a surface consisting of rack teeth extending thereacross the rack teeth of said discs lying at 90° to each other, a carriage movable in a plane above said discs normal to the surfaces of said discs and including the axes of said discs, a pair of gear trains mounted in said carriage each including a pinion in mesh with the rack teeth of one of said discs and extending to said sun gears meshing with said planitating gear, the distance between said pinions being the same as the distance between the axes of said discs.

4,047,452
BELT CONVEYOR DRIVE MECHANISM

Robert Truman Eddy, South Bend, Ind., assignor to Reliance Electric Company, Mishawaka, Ind.

Filed Mar. 15, 1976, Ser. No. 667,022
Int. Cl.[2] F16H *3/74*
U.S. Cl. 74—752 C 13 Claims



1. A drive mechanism for a belt conveyor system having a driven pulley and a belt trained thereon, said mechanism comprising a speed reducer having a housing drivingly connected to said driven pulley, a power input shaft for said speed reducer and reaction output shaft for said speed reducer disposed coaxially around said input shaft, a disc brake member connected to said reaction output shaft for rotation therewith, a friction head for restraining the rotation of said disc brake member, and means responsive to the load on the conveyor belt for controlling the restraining effect of said head on said brake member.

4,047,453
INDEXING ATTACHMENT FOR A DIVIDING HEAD

Henry J. Muller, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 10, 1976, Ser. No. 665,676
Int. Cl.[2] B23B *29/24*
U.S. Cl. 74—813 R 2 Claims

1. In an indexing mechanism for a dividing head, an indexing attachment for use with a six minute interval circular dividing plate, said indexing attachment increasing the indexing capabilities of said dividing head, said dividing plate having apertures disposed at spaced intervals circumferentially about a peripheral portion thereof, each of said apertures adapted to receive a retractable pin of a rotatable indexing arm of said dividing head, said attachment comprising a one minute interval disc

having a stem extending from a mid-portion thereof, said stem being adaptable for placement in any one of said apertures of said dividing plate such that said disc of said attachment will be disposed between the dividing plate and said retractable pin, said disc of said attachment is rotatable about its stem in order to align any of its apertures with the retractable pin of said

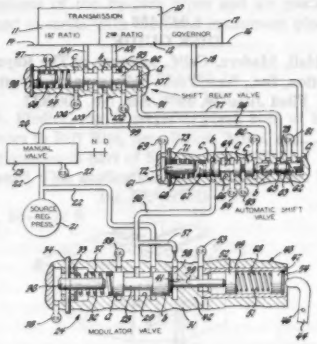
indexing arm containing a plurality of spaced apart apertures for receiving the retractable pin in place of the apertures of said dividing plate, said apertures of said disc being arranged in a spiral pattern and spaced apart in given increments to subdivide the spacing between successive apertures of one ring of apertures of said dividing plate, whereby a greater indexing capability is provided for said dividing head.

4,047,454

SHIFT SIGNAL VALVE HYSTERESIS

Ted M. McQuinn, Carmel, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 19, 1975, Ser. No. 551,000
Int. Cl.² B60K *21/00*
U.S. Cl. 74—868 **7 Claims**



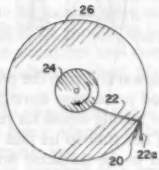
1. A multi-ratio transmission having a plurality of fluid pressure operated friction drive established means having a large fluid chamber selectively established to provide a low and a high speed ratio drive; a source of fluid at a regulated pressure; governor means connected to said transmission providing a governor signal varying with transmission speed; torque demand means providing a torque demand signal varying with torque demand; control means including relay valve means operatively connected to said source and a fluid pressure operated friction drive establishing means and normally biased to low position to establish low drive and having actuator means responsive to shift signal pressure for upshift to high position to establish high drive; automatic shift valve means operatively connected to said governor means, said torque demand means and said source having a bore and a shift valve element mounted for movement in said bore between an upshift position and a downshift position and governor and torque demand responsive means responsive to said governor signal and said torque demand signal to upshift said shift valve element from said downshift position to said upshift position at speeds increasing with increasing torque demand and to downshift said shift valve element from said upshift position to said downshift position at lower speeds, said bore of said automatic shift valve means having a large diameter bore portion and a slightly smaller diameter bore portion with a step therebetween, a shift signal port at said step connected to supply shift signal pressure to said actuator means, a source port in said large diameter bore portion and an exhaust port in said small diameter bore portion, said shift valve element having a large land fitting said large diameter bore portion, a small land fitting said small diameter bore portion and an intermediate portion slightly smaller than said small diameter bore portion to provide a highly restricted passage located and restricting flow between said signal port and said exhaust port and between said signal port and said main port to damp changes in said shift signal pressure to damp relay valve operation and for extended automatic shift valve hysteresis.

4,047,455

METHOD AND APPARATUS FOR SHARPENING END OF FILAMENT IN VEGETATION FILAMENT-TRIMMER

Charles B. Pittinger, Sr., Rte. 1, Box 68, Weatherford, Tex. 76086

Filed Apr. 14, 1976, Ser. No. 676,971
Int. Cl.² B21K *19/00*
U.S. Cl. 76—82.1 **10 Claims**



1. In the combination of a vegetation filament-trimmer having a filament with an inner end and an outer end, a drive connection with the inner end for sweeping the outer end in an intended path, and means on the filament trimmer for working the sweep of said outer end to said intended path on operation of the drive, the improvement comprising: the means for working including means for progressively shaping under centrifugal force on sucessively shorter radii the filament outer end to a predeterminable squared-off end shape, and means for holding the means for progressively shaping proximate said intended path.

4,047,456

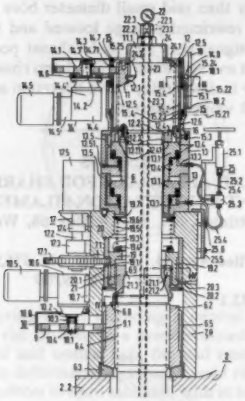
MOTOR-DRIVEN SCREWING AND TRANSPORTING TOOL FOR REACTOR PRESSURE VESSEL HEAD RETAINING FASTENINGS

Manfred Scholz, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Continuation of Ser. No. 639,922, Dec. 11, 1975, abandoned.
This application Sept. 21, 1976, Ser. No. 725,285
Claims priority, application Germany, Dec. 17, 1974, 2459645
Int. Cl.² B25B *29/02*
U.S. Cl. 81—57.38 **21 Claims**

1. A device for unscrewing and screwing nuclear reactor pressure vessel head-retaining nuts and screw studs, the studs extending upwardly through stud holes in a head flange of a removable head of a reactor pressure vessel, the studs having threaded lower ends screwed into threaded holes in the pressure vessel's top and threaded portions on which the nuts are screwed above the head flange to hold down the head on the pressure vessel with the studs under pretension between the vessel's top and the nuts, the nuts having external gear teeth for their rotation and the studs having upper ends spaced above the nuts; said tool comprising a support body and means for supporting said body at controllable heights on said head

flange; and unscrewing and screwing units for said nuts and studs, mounted on said body and having axial passages for releasable insertion of the studs and nuts; each of said units for a stud and nut when inserted in the unit's passage, having a pinion releasably meshing with the nut's said gear teeth and means for reversingly driving said pinion for unscrewing and screwing movements of the nut on the stud, gripping means for releasably gripping the upper end of the stud above the nut, and means for applying upward force to said gripping means



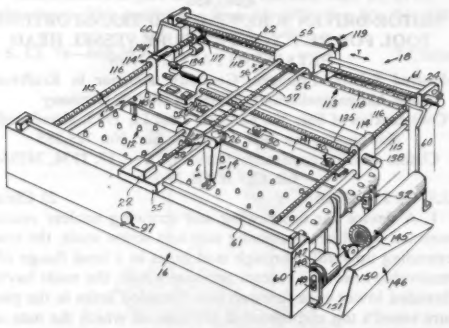
for stretching the stud upwardly from the pressure vessel's top to free the nut from said pretension during said movements; each of said units further having means for releasably engaging said reversibly rotating the stud so its said lower end can be unscrewed and screwed in the threaded hole in the pressure vessel's top while the nut remains screwed on the stud, and means for applying a lifting force to both the nut and stud to relieve the stud's said lower end from the weight of the nut and stud while being unscrewed and screwed in the pressure vessel's threaded hole.

4,047,457

SHEET METAL CUTTING

James Henry Stubbings, Rockville, Md., assignor to Potomac Applied Mechanics, Inc., Bethesda, Md.

Filed Nov. 11, 1975, Ser. No. 630,894
Int. Cl.[2] B26D *5/00*
U.S. Cl. 83—71 **30 Claims**



1. Automatic sheet metal cutting apparatus for cutting patterns and the like from sheets of metal fed to said apparatus in a feed direction, said apparatus comprising

a scissors cutting tool means having a pair of blades, one blade being adapted to be disposed above a horizontally arranged metal sheet to be pattern cut, and one blade being adapted to be disposed below said metal sheet,

conveying means for conveying said metal sheet into a pattern cutting position, said sheet being disposed in a horizontal plane, supporting means being associated with said conveying means for supporting said sheet so that said cutting tool means may cut through an edge thereof when pattern cutting is initiated and may pattern cut said sheet without damaging said conveying means during pattern cutting,

means for supporting said cutting tool means above said conveying means, in a position wherein said blades will be disposed above and below said sheet in a horizontal plane, and for movement in *x* and *y* horizontal directions substantially perpendicular to each other, and allowing access of said cutting tool means to at least one free edge of said sheet,

means for supporting said cutting tool means for substantially 360° angular, α, movement about a vertical axis,

x, *y*, and α motor means for automatically moving said cutting tool means in said *x*, *y*, and α directions,

computer control means for automatically controlling the operation of said *x*, *y*, and α motors for moving said cutting tool means to cut a desired, preprogrammed pattern from said sheet,

guide means for guiding movement of said metal sheet into said pattern cutting position,

clamping means for securely holding said metal sheet stationary at said pattern cutting position during pattern cutting thereof, and

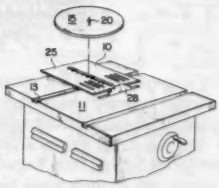
motor means associated with said cutting tool means for moving sais blades with respect to each other to shear said metal sheet during pattern cutting thereof.

4,047,458

DISK GUIDE

Lester W. Hall, Madera, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 29, 1976, Ser. No. 700,822
Int. Cl.[2] B27B *5/02*
U.S. Cl. 83—439 **2 Claims**



1. A guide plate for mounting on the work table of a power saw, said plate fitted with means to center and rotate the work piece with regard to the cutting point of the saw, in which the guide plate is fitted with a first bar of a size to fit in the miter slot of the work table, and fitted with a slidable second bar that is formed with a cylindrical hole, said hole of a diameter to rotatably fasten the cylindrical head section of a screw which is attachable to the work piece,

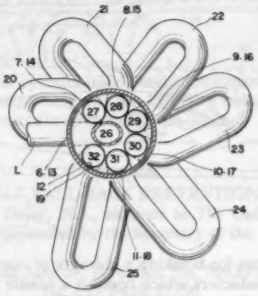
said screw formed with a cylindrical shaped head section joined to a tapered pointed section which pointed section is externally formed as a tapered male screw thread, with said pointed section separated from said head section by a projecting radial flange section of a size to extend beyond the circumference of the cylindrical hole of the slidable second bar, when the head section is engaged in said hole, so that the screw may freely rotate in the cylindrical hole of the slidable bar, with the flange supporting said screw in the axial direction of the screw, and so that a work piece threadably engaged in the pointed section may rest on the said radial flange section.

4,047,459

VALVE TUNING SYSTEM FOR THE BRASS MUSICAL INSTRUMENTS

Satoshi Nakamura, 556 Oaza Hakoda, Kumagaya, Saitama, Japan

Filed Aug. 8, 1975, Ser. No. 603,177
Int. Cl.[2] G10D 9/04
U.S. Cl. 84—390 12 Claims



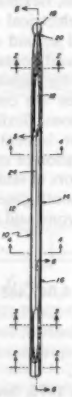
1. A valve tuning system for brass musical instruments comprising a single valve housing, a valve body movable in said housing, a basic instrument pipe and a plurality of by-pass pipes connected to the housing, a plurality of air passages formed in the valve body, tuning means which comprises a plurality of separately actuable finger keys, and means connecting said tuning means to said valve body operable to move the valve body to a plurality of switchover positions such that various combinations of the by-pass pipes and air passages may be connected in series with the basic instrument pipe.

4,047,460

DRUMSTICK

Mark A. Fiedler, and Darrell M. Hart, both of Edina, Minn., assignors to Riff Rite, Inc., Edina, Minn.

Continuation-in-part of Ser. No. 632,607, Nov. 17, 1975, abandoned. This application June 21, 1976, Ser. No. 697,705
Int. Cl.[2] G10D 13/00
U.S. Cl. 84—422 S 6 Claims



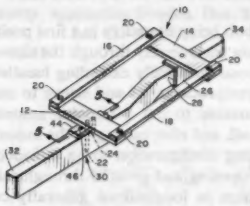
1. A drumstick comprising an elongated handle, a rounded striking tip and a reduced diameter neck connecting said tip to said handle characterized in that the drumstick includes two elongated parts secured together to form said tip, neck and handle, each part having a longitudinal groove therein so that a longitudinal bore is provided within said handle, the material forming said tip, neck and at least the portion of said handle adjacent said neck containing graphite fibers.

4,047,461

PIANO KEY BUTTON ALIGNMENT TOOL

Lew Forrest, 21414 DeLaOsa St., Woodland Hills, Calif. 91364

Filed June 18, 1976, Ser. No. 697,379
Int. Cl.[2] G10G 7/00
U.S. Cl. 84—458 5 Claims



1. A key button alignment tool for precisely locating a key button on a piano key, said key having a finger-tip contact end, a striking end, and an opening intermediate said ends, said fingertip end having a planar side wall which is parallel to the plane of movement of said key when struck;

a key button having a narrow longitudinal slot therein, said key button to be located upon said key over said opening with said slot to be parallel to said plane of movement;

said key button alignment tool comprising:

two pair of parallel members pivotally joined to form a parallelogram;

alignment means attached to one of said members, said alignment means being adapted to be placed within said slot and said opening; and

abutment means attached to a second member parallel to said one member, said abutment means being adapted to be placed against said side wall;

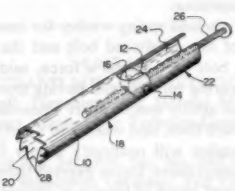
whereby when said alignment means is placed within said slot and said opening and said abutment means is placed against said side wall, said slot will be parallel to said side wall.

4,047,462

TOGGLE BOLT

Carl R. Hurtig, Cohasset, Mass., assignor to Encor Limited, Cohasset, Mass.

Filed Mar. 29, 1976, Ser. No. 671,411
Int. Cl.[2] F16B 21/02
U.S. Cl. 85—3 R 6 Claims



1. A toggle bolt comprising:

a generally tubular sleeve having on an end thereof a toothed cutting configuration suitable for cutting a circular opening through a wall to which the toggle bolt is to be mounted;

an internally threaded collar pivotally mounted in said sleeve at a position along the longitudinal axis of the sleeve providing a heavier portion between said collar and one end and a lighter portion between said collar and the opposite end of said sleeve;

a slot provided in the wall of said sleeve extending longitudinally between said collar and said opposite end;

a threaded bolt threadably mated with the collar and having a diameter less than the width of the slot and operative to pass through said slot into longitudinal generally coaxial alignment with said sleeve; and

an opening through the wall of said sleeve confronting said collar permitting threading of said bolt through said collar and passage through said opening into generally transverse position with respect to the longitudinal axis of said sleeve;

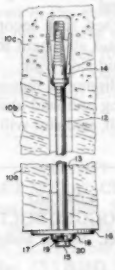
said threaded bolt being operative in a first position with the bolt extending transversely through the sleeve to provide first and second outwardly extending handles for manual rotation or reciprocation of said sleeve to cause said cutting configuration to cut a circular mounting opening through a wall, and after cutting of the mounting opening by said cutting configuration to be threaded out of said sleeve wall opening and pivoted through said slot into a second position in longitudinal generally coaxial alignment with said sleeve and operative to push said sleeve through the mounting opening in said wall.

4,047,463

TENSION INDICATOR

Chester P. Coldren, Canton, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed July 23, 1976, Ser. No. 708,446
Int. Cl.² F16B *31/02*
U.S. Cl. 85—62 **11 Claims**



1. A one-piece mechanical device for visually indicating if tension in a monitored bolt is within a predetermined range, said device comprising:

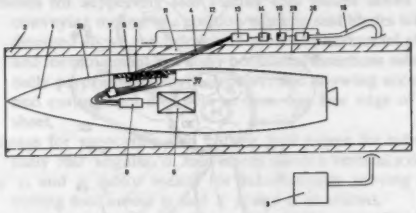
a substantially helical spring washer for insertion inbetween the head of the monitored bolt and the surface against which the bolt head exerts a force, said washer having opposed bearing surfaces and having free ends which are opposed but axially spaced apart when the washer is in an uncompressed state, said washer of a spring constant such that the washer will resiliently axially compress over a range of compressive forces exerted thereon equal to the predetermined range of tension in the monitored bolt, the axially extended outer circumferential wall of the washer being of a substantially constant thickness throughout the entire circumference thereof and being of a greater axial extension than the remainder of the washer, the free ends of the outer circumferential walls of the washer carrying indicia marks thereon which are spaced from and substantially centrally located between said opposed bearing surfaces and which will be substantially axially aligned upon the application of an axial compressive force to the washer equal to a tensile force within the given range.

4,047,464

UMBILICAL CORD BREAKER

Lars Evert Fredriksson, Vreta Kloster; Gunnar Jacobson, and Olof Bertil Olsson, both of Karlskoga, all of Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Jan. 29, 1976, Ser. No. 653,325
Claims priority, application Sweden, Feb. 19, 1975, 7501822
Int. Cl.² H01R *13/62;* F41F *3/04*
U.S. Cl. 89—1.811 **15 Claims**



1. Apparatus for breaking a plurality of continuous, flexible electrical conductors which connect a missile having an outer wall to a missile container, during launch of said missile from said container, comprising:

first means for securing one end of each of said continuous, flexible conductors in said missile container;

second means spaced from said first means for securing the other end of each of said continuous flexible conductors in said missile, so that said continuous flexible conductors extend across an open annulus separating said missile from said missile container;

an insert of electrically non-conductive material mounted in said outer wall of said missile and spaced from said container with said continuous flexible conductors extending through said annulus;

a plurality of holes, each having a diameter larger than the diameter of at least one of said continuous flexible conductors, extending through said insert through each of which holes at least one of said continuous, flexible conductors is passed from said first to said second securing means, each of said holes having an exterior outlet opening with an edge located at or below the outer surface of said outer wall, said at least one conductor being movable across said opening into contact with said edge, over which edge said at least one continuous, flexible conductor is bent as said continuous, flexible electrical conductors are tensioned between said first and second securing means when said missile moves out of said container during launch;

whereby during launch the tensile stresses in each continuous, flexible conductor are combined with the bending stress in each continuous, flexible conductor at the point where said conductor is bent over said edge, thereby producing a concentration of stress at said point sufficient to break said conductors at said point and thus to provide said missile with a smooth outer surface without conductor ends extending beyond said surface following breaking of said conductors.

4,047,465

TELESCOPED EXPLOSIVE DRIVER

William P. Wohlford, Bettendorf, Iowa, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 23, 1976, Ser. No. 708,163
Int. Cl.² F41F *1/00*
U.S. Cl. 89—8 **5 Claims**

1. A telescoped explosive driver comprising:

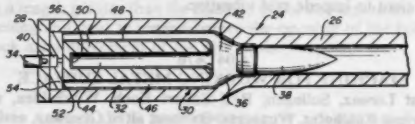
a central gas cylinder,

an annular gas cylinder telescoped over and spaced from said central gas cylinder,

an annular propellant filled cylinder surrounding said central

gas cylinder and positioned within said annular gas cylinder,

said driver having a projectile at one end and propellant detonating means at the other,



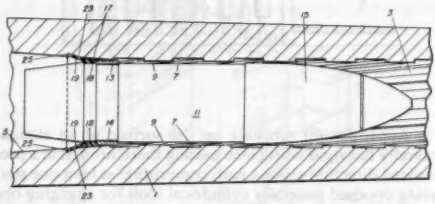
said propellant cylinder upon detonation expanding into and thereby compressing said gas cylinders and thereby ejecting said projectile upon expansion thereof.

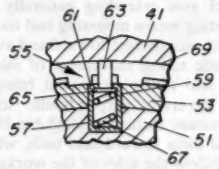
4,047,466

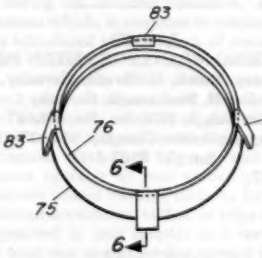
PROJECTILE FALL-BACK PREVENTION MEANS

Allen Berman, Dover, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 29, 1976, Ser. No. 709,837
Int. Cl.² F42B *31/00*
U.S. Cl. 89—14 R **9 Claims**







1. In a breech-loading gun that is loaded by first ramming a projectile into the gun barrel to a firing position therein and then inserting a separate propelling charge behind the projectile, means for preventing unlimited fall-back of said projectile from said firing position, comprising:

at least one fixed forwardly-facing internal locking shoulder on said barrel;

at least one movable rearwardly-facing external locking shoulder on said projectile; said projectile shoulder being located forwardly of said barrel shoulder when said projectile is in said firing position; and

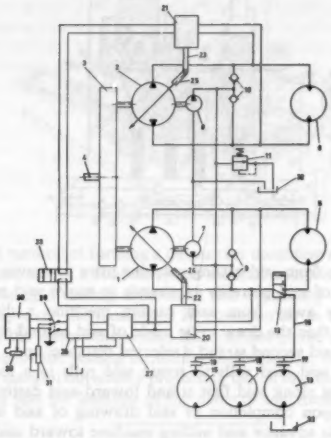
resilient means for moving said projectile shoulder into abutting relation with said barrel shoulder in the event of rearward movement of said projectile from said firing position.

4,047,467

DEVICE FOR GENERATING OIL PRESSURE FOR AN ARTILLERY PIECE OR A CORRESPONDING UNIT

Lars Olof Lundin, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Dec. 5, 1975, Ser. No. 638,223
Claims priority, application Sweden, Dec. 18, 1974, 7415879
Int. Cl.² F41G *5/04*
U.S. Cl. 89—41 H **7 Claims**



1. Apparatus for producing a flow of pressurized oil for selective operation of the weapon on a self-propelled artillery piece of the type having a plurality of driven wheels and at least one hydrostatic transmission for driving said wheels during self-propulsion, said at least one hydrostatic transmission comprising a variable displacement hydraulic pump and a hydraulic motor driven by flow from said pump, comprising:

means for selectively diverting the output flow of the variable displacement pump included in said at least one hydrostatic transmission from its associated hydraulic motor, to provide a flow of pressurized oil for operating said weapon; and

means responsive to said flow of pressurized oil for controlling loading, aiming, firing and related functions of said weapon.

4,047,468

STRAND MILLING METHOD

Heribert A. Krall, Wurzburg, and Helmut Maag, Hochberg, both of Germany, assignors to Technica-Guss GmbH, Wurnburg, Germany

Filed Jan. 14, 1975, Ser. No. 540,766
Claims priority, application Germany, Jan. 15, 1974, 2401732
Int. Cl.² B23C *3/13*
U.S. Cl. 90—11 C **3 Claims**

1. A method of milling a plurality of strands each drawn intermittently from a continuous casting machine, said strands passing through a displaceable milling machine, said milling machine having a pair of feed rolls engaging the upper and lower surfaces of a first of said strands, milling tools engaging the surfaces to be milled of all of said strands, and control means for regulating the direction and speed of rotation of said feed rolls, said method comprising the steps of:

actuating said feed rolls to rotate said rolls in a forward

direction to advance said milling machine toward said casting machine for milling the surfaces of said strands;

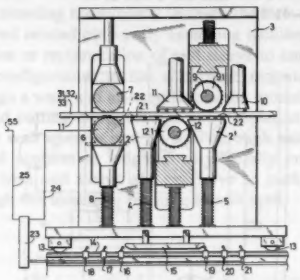
drawing said first strand a selected distance from said casting machine, said milling machine being carried away from said casting machine by said strand due to the engagement of said feed rolls with said first strand;

ceasing drawing of said first strand, said milling machine advancing toward said casting machine for continued milling of said strands;

actuating said feed rolls to rotate said rolls in a reverse direction along said first strand to withdraw said milling machine from said casting machine prior to drawing of a second of said plurality of strands to move said milling machine away from said casting machine a distance greater than the draw to be made of said second strand;

drawing said second strand a selected distance; and

actuating said feed rolls to rotate said rolls in a forward direction along said first strand toward said casting machine upon completion of said drawing of said second strand to advance said milling machine toward said casting machine for continued milling of said strands, whereby said selected distance of draw of said second strand is milled.

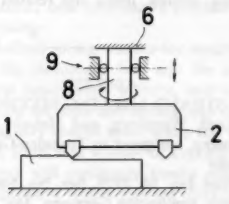


4,047,469

METHOD FOR SUPPRESSING CHATTER VIBRATIONS IN A MACHINE TOOL

Okitsugu Sakata, Tokyo, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Nov. 5, 1975, Ser. No. 629,066
Claims priority, application Japan, Nov. 5, 1974, 49-126682
Int. Cl.² B23Q *11/00*
U.S. Cl. 90—11 C **6 Claims**



3. In a method of machining a workpiece in which a tool has a first portion secured to a support, an intermediate portion freely projecting from said support in a predetermined direction, and a terminal portion connected to said first portion by said intermediate portion, said terminal portion engages a workpiece and removes material from said workpiece during relative movement of said tool and of said workpiece, whereby vibration may be induced in said tool, the improvement which comprises:

a. holding an inert mass in contact with said intermediate portion under a force applied in a direction transverse to said predetermined direction; and

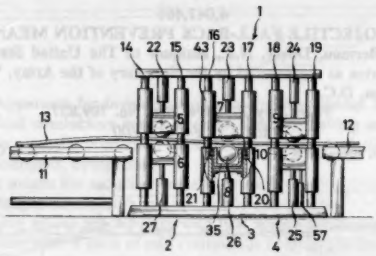
b. continuously shifting the contact of said mass with said intermediate portion in said predetermined direction during said relative movement, said applied force being sufficient to impede said vibration.

4,047,470

MACHINE FOR WORKING METAL SURFACE

Horst Lorenz, Solingen; Rolf Eckart Koch, Witzhelden, and Reiner Kahlhofer, Wuppertal-Barmen, all of Germany, assignors to Th. Kieserling & Albrecht, Solingen, Germany

Filed Oct. 8, 1975, Ser. No. 620,776
Claims priority, application Germany, Oct. 10, 1974, 2448360
Int. Cl.² B23C *3/13*
U.S. Cl. 90—15 R **18 Claims**



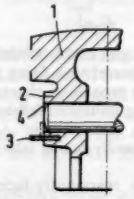
1. Apparatus for working on the surface of an elongated generally flat rigid workpiece passing therethrough in a predetermined direction along a path comprising; at least one station having opposed generally cylindrical tools for engaging opposite generally flat irregular sides of a workpiece, said tools having tool axes extending generally perpendicular to said path, mounting means mounting said tools for automatic movement of said axes thereof toward and away from said path and for automatic tilting movement of said axes relative to said path with said tilting movement being generally in a plane extending generally perpendicular to said path, and said mounting means including yieldable biasing means yieldably biasing said tools toward said path, whereby said tools automatically follow the sides of the workpiece even though such sides are irregular due to curves, twists, and dimensional and shape variations in the workpiece.

4,047,471

LOCKING MEANS FOR PISTON PIN

Wolfgang-Hermann Noack, Heilbronn, Germany, assignor to Karl Schmidt GmbH, Neckarsulm, Germany

Filed Feb. 9, 1976, Ser. No. 656,667
Claims priority, application Germany, Mar. 27, 1975, 2513579
Int. Cl.² F16J *1/18*
U.S. Cl. 92—187 **2 Claims**



1. In a piston having bosses with openings and a piston pin loosely mounted in the bosses and wherein the piston has a larger outside diameter than the external distance between the

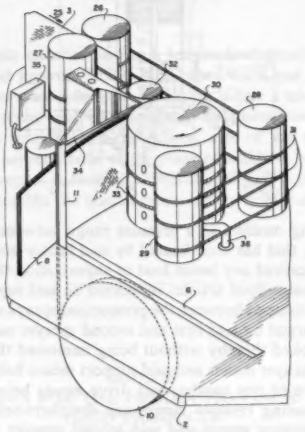
bosses, comprising: at least one locking pin means for each boss opening for securing the piston pin in the bosses, said locking pin means being fabricated from a bendable material and having one arm cast embedded into the external surface of the boss and extending substantially parallel to the axis of the boss opening and another arm connected to said one arm and having a length greater than the distance of the one arm to the boss opening and bent to extend before the opening of the boss to block axial movement of the piston pin.

4,047,472

APPARATUS FOR OPTICALLY MARKING PREDETERMINED POSITIONS IN A STACK OF DOCUMENTS

Markus Haberstroh, Munich, Germany, assignor to G.A.O. Gesellschaft fur Automation und Organisation mbH, Germany

Continuation-in-part of Ser. No. 527,763, Nov. 27, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 665,701
Claims priority, application Austria, Dec. 12, 1973, 10379/73
Int. Cl.² B31B *1/98*
U.S. Cl. 93—93 D **7 Claims**



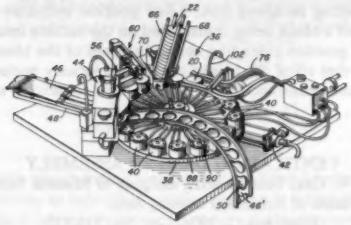
1. In apparatus for optically marking predetermined positions in a stack of documents, such as for subdividing a stack of documents, during the stacking operation, with the aid of mechanical means which, in response to control signals, can be mechanically introduced into the stack of documents between two successive documents, the improvement comprising, in combination, a horizontally oriented stacking table arranged to support a stack of vertically oriented documents stacked on edge thereon; a vertically oriented support movable horizontally relative to said stacking table and arranged to support the stack of documents stacked on edge on said stacking table; conveyor means operable to feed vertically oriented documents successively to said stacking table for forming a stack of vertically oriented documents stacked on edge on said stacking table and supported by said support in a vertically oriented condition; at least one elongated slot formed in said stacking table and extending perpendicularly to the stack of documents; at least one rotatable disc disposed beneath said stacking table in alignment with a slot therein, the plane of rotation of each rotatable disc being perpendicular to the stack of documents; and at least one flexible narrow strip, forming a separating finger, secured to the circumference of each rotatable disc and, when the disc is in a starting position, extending tangentially away from the associated rotatable disc beneath said stacking table; each flexible narrow strip, when the associated rotatable disc is turned through a predetermined angle from its starting position extending vertically through the associated slot of the stacking table and engaging against the last document added to the stack and, responsive to rotation of the associated rotatable disc through a further angle in the same direction, slipping out through the associated slot again.

4,047,473

ASSEMBLY SYSTEM FOR CONTAINER FLEXIBLE END CLOSURES

Wade D. Fletcher, and E. Riley Rowe, both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed June 11, 1975, Ser. No. 586,011
Int. Cl.² B31B *1/90*
U.S. Cl. 93—36 B **15 Claims**



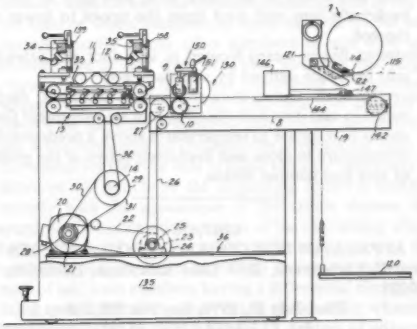
1. A method of forming a closure for mounting as a unit over the open end of a container, said method comprising the steps of forming a sealing membrane and releasably engaging an overcap over the membrane in a manner so as to releasably secure the membrane within the confines of the overcap, the forming of the sealing membrane including the steps of forming an integral outwardly projecting tab on said membrane and folding said tab laterally of the plane of said membrane.

4,047,474

APPARATUS FOR SEPARATING AND STACKING BLANKS OF A DIE CUT SHEET

Pierre Lang, Ecublens, Switzerland, assignor to J. Bobst & Fils S.A., Switzerland

Filed Sept. 11, 1975, Ser. No. 612,572
Claims priority, application Switzerland, Oct. 2, 1974, 013249/74
Int. Cl.² B31B *1/12, 1/98*
U.S. Cl. 93—36 A **9 Claims**



1. An apparatus for separating a plurality of interconnected blanks formed in at least one row in a sheet and for stacking the separated blanks in a plurality of designated stacks, comprising an input means for receiving the sheet with each row of blanks extending parallel to the direction of movement of the sheet in the input means, separating means arranged to receive a sheet from the input means and to separate the blanks into a flow of

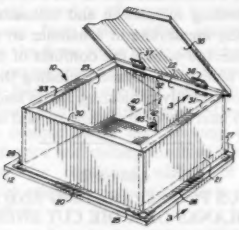
spaced blanks with the blanks of each row moving in a path one after another, and stacking means for depositing the separate blanks in designated stacks including a frame, means mounted on the frame for supporting each of the designated stacks and including means for receiving a separate designated stack for each of the blanks in a row of the sheet, suction means for each row of blanks mounted on the frame above the support means for engaging an upper surface of each of the blanks of the row and transporting each of the engaged blanks to a position above the means for receiving for its designated stack on the support means, and means for releasing the blank from the suction means to cause the depositing of each blank onto its designated stack, said means for releasing comprising a peeling member mounted for pivotable movement at each of said designated stacks, and means for simultaneously pivoting each of the peeling members from a first position withdrawn from the path of a blank being transported on the suction means and a second position extending across the path of the blank at an angle so that all of the blanks are simultaneously peeled from the suction means and deposited into their respective stacks.

4,047,475

VENTILATING DAMPER ASSEMBLY

Howard W. Cox, Tempe, Ariz., assignor to Mission Marketing Corporation of Arizona, Phoenix, Ariz.

Filed Aug. 2, 1976, Ser. No. 710,920
Int. Cl.[2] F04D *25/08, 25/14;* F24F *7/00, 13/00*
U.S. Cl. 98—116 **7 Claims**



1. A ventilating damper assembly including, in combination:
a ventilating ceiling duct having upper and lower open ends;
first normally-closed pressure-opened damper means for closing said duct, said damper means located to open in response to air flow from the lower to upper end of said duct and biased to normally close said duct to prevent backdrafts into said duct from the upper to lower end thereof;
abutment flange means located in said duct and extending into the space defined by said duct; and
normally-open temperature-responsive anti-draft damper means in said duct and closed against said abutment flange means in response to temperatures above a predetermined temperature to close said duct irrespective of the position of said first damper means.

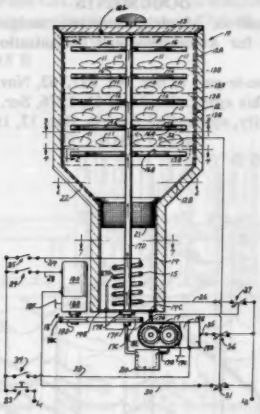
4,047,476

APPARATUS FOR COOKING FOOD ARTICLES

Benno E. Liebermann, 2805 Lime Kiln Lane, Louisville, Ky. 40222

Filed July 21, 1976, Ser. No. 707,318
Int. Cl.[2] A47J *27/00, 27/52*
U.S. Cl. 99—325 **10 Claims**

1. Apparatus for cooking food articles, comprising:
a. a chamber;
b. support means for locating food articles within said chamber with substantially all of their exterior surfaces being exposed;
c. sump means having an inlet fluid-connected to said chamber for containing a liquid cooking medium.
d. heater means for heating the liquid cooking medium contained in said sump means;
e. first sprayer means located within said chamber adjacent to a first side of said suppot means;
f. second sprayer means located within said chamber adjacent to a second side of said support means that is opposite from said first side and being aligned in a common plane with said first sprayer means; and
g. pump means fluid-connected to said sump means and to both of said sprayer means to admit to said chamber, through both of said sprayer means and onto the food articles supported therein, a pressurized spray of liquid



cooking medium in a pressure range between 10 and 70 p.s.i.g. that has been heated by said heater means but has not received any latent heat of vaporization therefrom so as to cause food articles supported on said support means to be clamped between the pressurized sprays respectively discharged by said first and second sprayer means and to be cooked thereby without being immersed therein,
h. said sprayer means and said support means being movable relative to one another and drive means being provided for causing relative movement therebetween with said first sprayer means and said second sprayer means continuing to remain aligned in a common plane with one another.

4,047,477

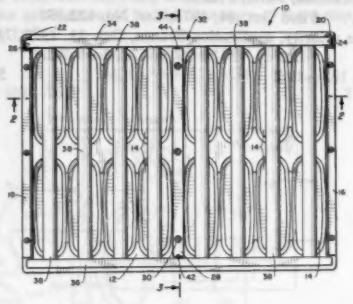
HOT DOG BUN BAKING PAN

Julius B. Berke, 21205 Saticoy St., Apt. 10, Canoga Park, Calif. 91304

Filed Oct. 17, 1975, Ser. No. 619,598
Int. Cl.[2] A21B *5/02*
U.S. Cl. 99—428 **2 Claims**

1. A hot dog bun baking pan comprising:
a substantially flat plane base including upstanding side wall members secured to said base, whereby said upstanding side walls prevent the dough during baking from moving exteriorly of said base, and, said base being divided into a plurality of dough receiving sections;
an overlying member removably connectable to said base, said member having a pair of transverse sides which are interconnected by a plurality of elongated oval shaped rods, said member adapted to be placed upon said base with one of said rods to extend centrally through each said dough receiving section, whereby with dough placed within each dough receiving section and said member placed upon said base during the baking operation the dough will conform around its respective said rod resulting in the forming of a hot dog bun with an elongated hot dog receiving recess detachable connecting means be-

tween said member and said base to secure said overlying member to said base and, positioning means attached to said base, said positioning means to connect with said member to locate said member at a particular location upon said base, said positioning means comprising a pair of spaced apart U-shaped upright guide members both located directly adjacent the periphery of said base, each



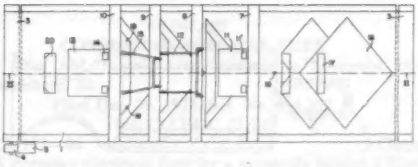
said guide member having a longitudinal groove therein with said grooves facing each other, each end of one of said transverse sides is to cooperate within a said longitudinal groove, each said elongated rods being oval shaped in cross section with the longest axis of the rod being located perpendicular to the plane of said base, whereby a deeper recess is formed within the formed hot dog bun which permits the bun to more readily hold the hot dog.

4,047,478

APPARATUS FOR THE PRODUCTION OF ROLLED FOOD PRODUCTS

Erik Trostmann, Birkerod, and Ove Albertsen, Lyngby, both of Denmark, assignors to Dansk Styreteknik A/S, Denmark

Filed June 19, 1975, Ser. No. 588,319
Claims priority, application Denmark, June 24, 1974, 3381/74
Int. Cl.[2] A23P *1/00*; A21C *11/00*
U.S. Cl. 99—450.1 **9 Claims**



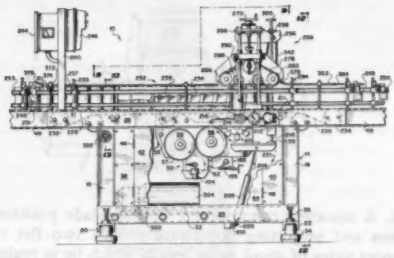
1. An apparatus for producing rolled food products comprising a support for supporting a flat wrap and a filler substance placed atop the flat wrap, means for successively folding the front portion and the opposite side portions of the wrap onto the filler substance and means for rolling the folded wrap with its filler substance towards the rear edge of said wrap, the means for successively folding the front and opposite side portions of the wrap onto the filler substance comprises means for generating a pressure differential across said portions, the pressure above said portions being less than the pressure below said portions.

4,047,479

HIGH SPEED ARTICLE CODING MACHINE

James G. McKay, deceased, late of Skokie, Ill., by Allen J. McKay, executor, Palatine, Ill., assignors to Kiwi Coders Corporation, Chicago, Ill.

Filed Apr. 28, 1975, Ser. No. 571,906
Int. Cl.[2] B41F *17/00*
U.S. Cl. 101—36 **29 Claims**



1. A high speed coding machine for applying a code imprint consecutively to individual articles moving in a line along the upper reach of conveyor means along a path of movement to an imprinting zone arranged positioned along said path, the imprinting zone having an imprinting location, said coding machine comprising:

framework means for supporting the operating components of said machine;

feed means for introducing articles individually at regularly spaced intervals traveling to the imprinting zone at a speed correlated with the speed of the conveyor means;

drive means, including a single source of power, operably connected to the operating components of said machine;

hold-down means arranged along the path of movement of said articles at the imprinting zone for applying a positive force to said articles at least during the imprinting thereof; and

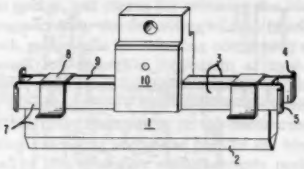
a rotary inking and imprinting assembly including a train of rotary wheel members arranged aligned with their circumferential surfaces respectively in tangential engagement, support means for drivably mounting said train of wheel members, a source of liquid ink, a driven rotary ink applicator arm having a free end traversing a generally circular path through said ink source and effecting momentary contact with the circumferential surface of one of the train of wheel members to apply ink thereto for successive transfer to the other members of said train and another one of said train of wheel members carrying a plurality of printing heads and comprising an imprinting wheel, each of said heads carrying type font adapted to receive ink thereon for applying said imprint, said imprinting wheel arranged to circumscribe a rotational path of movement for the type font to place same consecutively to intercept the article at the imprinting location simultaneously with the appearance of the article thereat, the speed of circumferential rotation of the imprinting wheel being correlated with the speed of the conveyor and the number of printing heads carried by the imprinting wheel, each of said train members having a differential circumferential speed of rotation one relatve to the other whereby incrementally to change the point of contact of adjacent train members with each circumferential revolution thereof whereby uniformly to apply and spread the ink upon the circumferential surface of said respective train members and there are means coupled between said drive means and said applicator arm variably controlling the speed of rotation of said applicator arm at a rate from zero to and including the maximum rate of speed of said train of wheel members.

4,047,480

LONGITUDINALLY FLEXIBLE SQUEEGEE AND MOUNTING STRIPS THEREFOR

Eustathios Vassiliou, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 30, 1976, Ser. No. 710,103
Int. Cl.[2] B41F *15/44*
U.S. Cl. 101—123 **3 Claims**



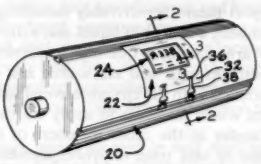
1. A squeegee comprising a flexible blade positioned between and projecting downwardly from two flat resilient support strips of about equal length which lie in register and whose flat sides lie in parallel planes, the strips projecting beyond the ends of the blade, to form a blade/strip assembly; a plurality of short channel bars positioned astride the assembly, snugly fitting and so spaced along its top edge that at least one bar is on each side of the assembly's longitudinal center, one side of each bar being immovably attached to one support strip but not the other;
and
means for mounting the assembly.

4,047,481

APPARATUS FOR PRINTING INDICIA ON CORRUGATED BOARD AND THE LIKE

Philip G. Saunders, Toledo, Ohio, assignor to Container Graphics Corporation, Toledo, Ohio

Filed Mar. 1, 1976, Ser. No. 662,561
Int. Cl.[2] B41F *27/12*
U.S. Cl. 101—376 **7 Claims**



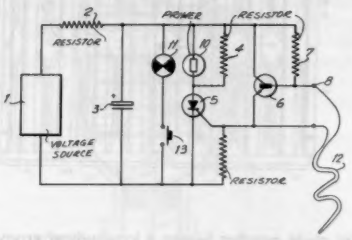
1. Apparatus for printing indicia on corrugated board comprising a printing plate cylinder having at least two mounting flanges thereon, and a printing assembly, said printing assembly consisting of a mounting sheet of dimensionally-stable, solid, calendered, rigid, polyvinyl chloride sheeting having a uniform thickness, said mounting sheet having a structurally integral lip formed on one edge thereof and engaging one of said cylinder flanges, the opposite edge of said mounting sheet having openings therein, mounting straps received in said openings and engaging another of said cylinder flanges, a printing plate comprising a layer of a resilient material with printing surfaces thereon and recesses between the printing surfaces, and a dimensionally-stable sheet affixed to said layer in a location spaced from said printing surfaces and said recesses, an adhesive layer affixing said printing plate to said mounting sheet in a predetermined position, said printing surfaces being on the side of the printing plate opposite said dimensionally-stable sheet, and a resilient and compressible pad affixed to the side of said mounting sheet opposite said printing plate, being of a size at least equal to the size of said printing plate, and also being located between said mounting sheet and said printing plate cylinder.

4,047,482

ELECTRONIC IGNITER CIRCUIT FOR DETONATING AN ELECTRIC PRIMER

Jean Kervizic, Versailles; Claude Deslandes, Saint-Mande, and Alain Berson, St-Germain en Laye, all of France, assignors to Etat Francais, Paris, France

Filed Oct. 14, 1975, Ser. No. 622,395
Claims priority, application France, Oct. 11, 1974, 7434198
Int. Cl.[2] F42B *23/26, 3/10, 19/12*
U.S. Cl. 102—19.2 **5 Claims**



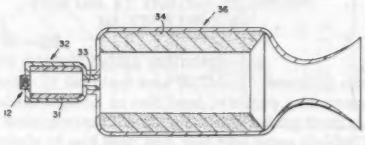
1. In an electronic igniter adapted to detonate a pyrotechnical charge by the rupture of a tripping wire comprising a direct current source, a first resistor connected to one terminal of said source, a primer, a condensor, said primer and condensor being connected in parallel to said source, and semi-conductor control means connected to the tripping wire and to said primer to detonate the latter when the tripping wire is ruptured, an improvement comprising control means for checking the functional integrity of the igniter, said control means including a voltage sensor connected in parallel to said condensor and to said primer, switch means connected in series with the voltage sensor, and an adaptation element connected to said voltage sensor as a unit assembly.

4,047,483

INITIATOR FOR USE IN LASER BEAM IGNITION OF SOLID PROPELLANTS

Nathan P. Williams, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 24, 1976, Ser. No. 670,012
Int. Cl.[2] F23Q *13/00*
U.S. Cl. 102—70.2 A **2 Claims**



1. In a laser activated initiator for igniting solid propellants having a tubular container, a transparent window secured to said container at the rim of said container, a pyrotechnic pellet housed in said container, said pellet having a surface on which combustion is initiated, and a laser beam which shines through said transparent window onto said surface of said pyrotechnic pellet, the improvement: wherein said pellet has a flat side opposite said surface and said surface of said pellet is concave and generally conical ending in a tip with the tip being adjacent said flat side and separated therefrom by a thin web of pyrotechnic material forming a breakaway/burn section,

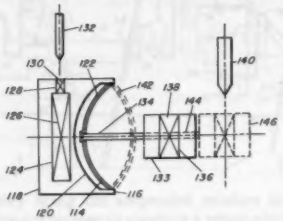
whereby rays of said laser beam striking said surface tend to be reflected off of said surface wall toward the tip of said surface, the energy from said laser beam thus being concentrated at said tip and insuring ignition of said pellet on or near the top of said surface.

4,047,484

FUZE WITH BIMETALLIC SPRING DELAY MODULE

Lewis C. Cole, Chester, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 29, 1976, Ser. No. 700,993
Int. Cl.² F42C *15/34*
U.S. Cl. 102—76 P **2 Claims**



1. A fuze providing delay arming and impact functioning of a munition, which comprises

a bimetallic spring delay module comprising

a bimetallic spring, and

a pyrotechnic charge for heating said spring, said spring being capable of inverting from a first stable position to a second stable position by heat from the pyrotechnic charge and of reverting to said first position by cooling,

a detonator,

a firing pin driven by impact of the fuze with a solid target, and

a safing and arming means attached to said bimetallic spring for preventing contact of the firing pin with the detonator when the spring is in said first position, and for permitting contact of the firing pin with the detonator when the spring is in said second position;

whereby ignition of the pyrotechnic charge causes the bimetallic spring to be heated and to invert from said first position, wherein the fuze is in an unarmed condition, to said second position, wherein the fuze is in an armed condition permitting the firing pin to strike the detonator by impact of the fuze on a solid target and the fuze, if not activated by impact while in the armed condition, is returned to the unarmed condition by reversion of said bimetallic spring on cooling.

4,047,485

COMPACT ELECTRICAL FUZE

Edgar John Abt, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

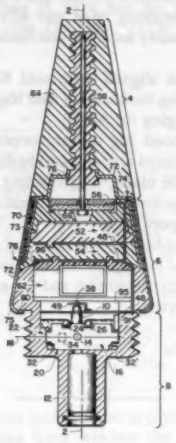
Filed Dec. 24, 1975, Ser. No. 644,212
Int. Cl.² F42C *15/26*
U.S. Cl. 102—80 **5 Claims**

1. A compact electrical fuze for a projectile having a flight path axis, being subject to centrifugal and setback forces thereon, the fuze including a lead charge having a major axis, detonator means, booster charge means, and safing and arming means, said safing and arming means comprising:

a plurality of drive balls;

barrel means having an axis of rotation being normal to the flight path of the fuze and projectile, said barrel means being located between said detonator means and said booster charge means, said detonator means and said booster charge means being located nominally on the flight path axis, said barrel means containing said lead charge, said barrel means being supported by a trunion mount at each extremity thereof for rotation of said barrel means about said normal axis, said barrel means having a plurality of slots on a surface thereof for containing a first portion of each of said plurality of drive balls; and

cavity means for mounting said barrel means for rotation about said normal axis, said cavity means having a plurality of cooperating slots on an inner surface thereof for containing a second plurality of each of said plurality of



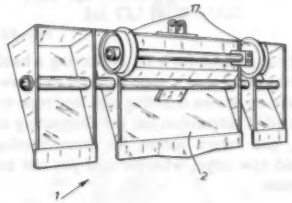
drive balls in cooperation with said plurality of slots on said surface of said barrel means, said slots on said barrel means and said slots on said cavity means inner surface being mutually shaped for providing rotation of said barrel means in response to the centrifugal forces on said plurality of drive balls and said barrel means, said shaped slots being formed to allow no more than one of said plurality of drive balls to exert a rotational force on said barrel means at any given time.

4,047,486

EXCAVATOR BLADE FOR REPLACING RAILROAD SLEEPERS

Melvin Pabsdorff, Hamar, Norway, assignor to A/S Hymas, Brumunddal, Norway

Filed July 21, 1975, Ser. No. 597,948
Int. Cl.² E01B *27/02, 29/06*
U.S. Cl. 104—9 **1 Claim**



1. A blade for use with an excavator having a mobile, power-operated, articulated arm and hydraulic means acting in conjunction with the articulated arm, the blade having particular utility in replacing sleepers secured in the foundation ballast of a railroad track, comprising:

a plate including a primary working surface and a reverse surface, said plate having a width at least equal to the width of said replacing sleepers and a depth substantially greater than the distance from the top of the track to the bottom of the foundation, said plate having a pair of re-

cesses symmetrically spaced across the width of one edge thereof, the recesses having a center distance corresponding to the gauge of the track, a width for clearance of the track and a depth at least as large as the sum of the construction height of the rail of the track and the sleeper, said one edge constituting the working edge of the plate;

wearing steel means mounted on said working edge of the plate;

first lug means mounted on said plate proximate the edge opposite said working edge and adjacent said working surface for rotatably securing said blade to said articulated arm;

second lug means aligned with said first lug means and spaced therefrom for securing said blade to the hydraulic means for swinging the blade;

said first and second lug means cooperating respectively with said articulated arm and said hydraulic means at least for actuating the blade for displacing the ballast and replacing the same ballast of said foundation during replacing of said sleepers, and

a pair of flanged wheel means mounted on the reverse surface of the plate for supporting one end of said excavator through said articulated arm and for guiding said excavator along said track.

4,047,487

TOWING MECHANISM FOR A SKI LIFT

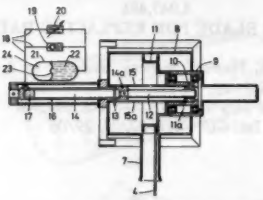
Samuel G. Wyss, Sporthaus, 3801 Kleine Scheidegg, Bern, Switzerland

Filed Aug. 10, 1976, Ser. No. 713,111

Claims priority, application Switzerland, Aug. 22, 1975, 10930/75

Int. Cl.[2] B61B *11/00*

U.S. Cl. 104—173 ST **3 Claims**



1. A towing mechanism for a ski lift having a hauling cable, of the type comprising a tow rope secured to a towing bar, a pay-out and take-up device enabling said tow rope to be pulled out and retracted, a suspension bar for connecting said device to said cable, and return means for counteracting pay-out traction on said tow rope, wherein said pay-out and take-up device comprises:

a housing,

a luffing drum non-displaceably mounted for rotation within said housing,

a nut rigidly secured to said rope-drum,

a screw-spindle non-rotatingly mounted for longitudinal displacement within said housing, said nut and said screw-spindle together forming a non-self-locking screw gear, and

a hydraulic-pneumatic device including a piston rigidly secured to said screw-spindle for returning said screw-spindle after longitudinal displacement thereof.

4,047,488

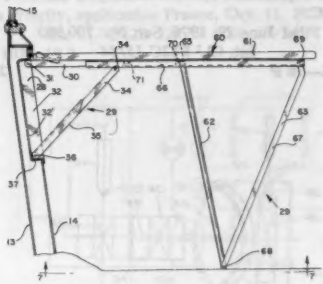
TABLE ARRANGEMENT FOR RAILWAY PASSENGER CAR COMPARTMENTS

Jack E. Gutridge, Dyer; Ronald W. Marsh, Michigan City, both of Ind., and Grant M. Newbury, Shawano, Wis., assignors to Pullman Incorporated, Chicago, Ill.

Filed Sept. 2, 1976, Ser. No. 720,021

Int. Cl.[2] B61D *1/02*

U.S. Cl. 105—315 **10 Claims**



1. A passenger compartment for a railway car formed by an outer side wall, longitudinally spaced and laterally extending partition walls, and a divider wall extending longitudinally and having a door opening providing access to said compartment,

a passenger seat positioned against each partition wall and extending laterally therewith, the improvement including;

a table arrangement adapted to be positioned in use position between said seats comprising;

a first table supported on said first outer side wall in a flat upright stored position,

means supporting said first table on said outer wall whereby the same may be moved to a horizontal use position,

means releasably locking said table in said use position,

a second table including means releasably connecting the same to one of said walls in an upright stored position,

said second table including a table top having connector means,

said second table being movable to a horizontal use position whereby said connector means engages said first table to connect said tables together with said first table serving as a support means for said second table top, and

said connector means including releasable latch means for releasably locking said tables in said use position.

4,047,489

INTEGRATED PROCESS FOR PREPARING AND FIRING BAGASSE AND THE LIKE FOR STEAM POWER GENERATION

Temple S. Voorheis, Atherton, and James H. White, Palo Alto, both of Calif., assignors to Coen Company, Inc., Burlingame, Calif.

Filed Jan. 7, 1976, Ser. No. 647,029

Int. Cl.[2] F23G *5/04*

U.S. Cl. 110—15 **7 Claims**

1. An integrated method for preparing and suspension firing bagasse and bagassillo as a primary fuel for heating and steam power generation in a sugar cane refinery which produces bagasse and bagassillo as a wet by-product which comprises the repetitive substantially continuous sequential steps of:

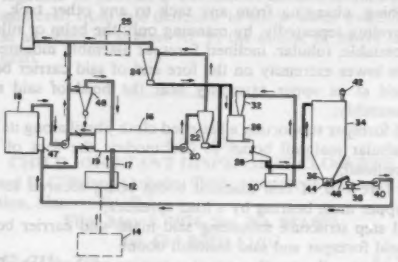
mixing the wet by-product with de-ashed hot flue gases of a bagasse fired suspension burner, thereby driving it and reducing the temperature of the drying flue gases;

separating the by-product dried thereby from the drying flue gases in a primary cyclone collector and directing the flue gases emitted from said primary cyclone collector through a secondary cyclone collector to capture substan-

tially all suspended particulate material preventing its exhaustion into the atmosphere; thereafter

sizing the dried by-product, directing by-product fines up to a maximum pre-selected size to temporary substantially enclosed storage while regrinding and resizing oversized by-product; thereafter

metering out, spacing and pneumatically suspending the by-product fines, for providing a smooth-flowing suspended fuel-air mixture; thereafter



controllably firing the suspended mixture in a suspension type furnace burner to produce a relatively high temperature heat output and a combustion effluent characterized by substantially complete combustion; thereafter

directing the combustion effluent through a cyclone collector to extract substantially all ash from the hot flue gases of the burner; and thereafter

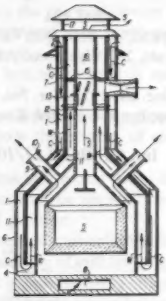
utilizing the resultant flue gases for subsequent drying of further wet by-product.

4,047,490

RECUPERATIVE HEATING SYSTEM

Vincent Galluzzo, 8548 Oakleigh Road, Baltimore, Md. 21234

Filed Sept. 7, 1976, Ser. No. 720,671
Int. Cl.[2] F23L *15/04*
U.S. Cl. 110—56 **5 Claims**



1. A recuperative heating system, comprising:

a. a heat conductive chimney flue;

b. a fuel combustion chamber exhausting hot waste gases and smoke upwardly through said flue;

c. duct means, telescopingly spaced about said flue, defining a fresh air flow path downwardly along the outer of said duct means and upwardly along the inner of said duct means into direct heat exchange relationship with the outer surface of said flue and exhausting outwardly from said inner duct means; and

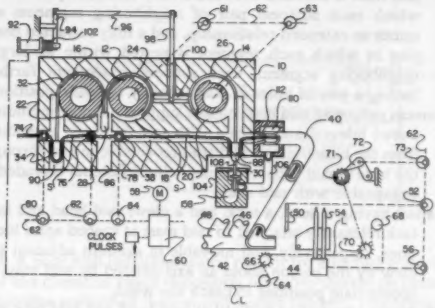
d. a plurality of conduit means, each having an intermediate heat exchange section within said flue, with the inlet end of each said conduit means opening into said outer duct means and the outlet end of each said conduit means opening into said inner duct means.

4,047,491

MULTI-COLOR TUFTING MACHINE

Abram N. Spanel, Princeton, N.J.; P. Frank Eiland, Stamford, and David R. Jacobs, New Canaan, both of Conn., assignors to Abram N. Spanel, Princeton, N.J.

Filed June 25, 1976, Ser. No. 699,904
Int. Cl.[2] D05C *15/34*
U.S. Cl. 112—79 A **19 Claims**



1. Tufting apparatus including bit-applying means for applying tufts to a backing layer wherein the improvement comprises a yarn supply system having:

feeding means including yarn displacement metering means;

means for controlling said feeding means including:

an oscillatory feeding shaft;

a flexible feeding band member engageable with said oscillatory feeding shaft, said band member being extendable within a track to prevent unwanted flexing, said track extending to a yarn plunger for engaging yarn; and,

means to cause said feeding band member to engage with said oscillatory feeding shaft enabling said feeding band member to be driven when said feeding shaft oscillates; and,

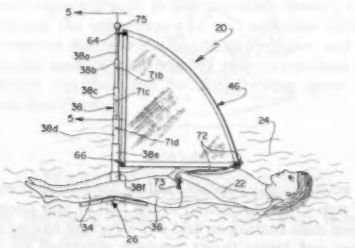
pneumatic yarn transport means to transport the yarn to said bit-applying means.

4,047,492

SAILING DEVICE

Marlene J. Brown, 226 Pequot Ave., Mystic, Conn. 06355

Filed Apr. 12, 1976, Ser. No. 676,053
Int. Cl.[2] B63B *35/00*
U.S. Cl. 114—39 **3 Claims**



1. Apparatus for propelling the body of a person floating in the water comprising:

a floatable support member having a substantially continuous planar surface over which the person's legs are posi-

tioned in the water and having a centrally located bore extending therethrough;

a mast releasably mounted on said member and extending upwardly from said planar surface between the person's legs and achieving a normally upright relationship with the surface of the water only when the person's legs are positioned upon said planar surface, said mast being collapsible and including a plurality of interconnected hollow segments, each successive segment capable of nesting within its larger neighboring segment, and resilient detent means associated with each pair of adjacent segments for maintaining said pair in an extended relationship such that said mast is movable between a fully extended position in which each adjacent pair of neighboring segments assumes an extended relationship, and a fully retracted position in which each segment is nested within its larger neighboring segment, each successive segment further having a pair of holes at diametrically opposite positions;

means mounting said mast on said support member including a stud integral and coaxial with said mast and extending from the base thereof, said stud receivable in and through the bore in said support member, and a fastener threadedly engageable with said stud;

a sail having a head, a tack, and a clew, said head and said tack releasably attached to said mast at spaced apart locations, respectively, and movable in azimuth adjacent the clew by the person about an axis defined by said mast to appropriate positions to catch the wind;

fasteners attached to said sail at said head and said tack and receivable through the pair of holes of said segments at spaced apart locations to thereby releasably attach said sail to said mast; and

control means attached to said clew for aiding the person in moving said sail in azimuth relative to said mast.

4,047,493

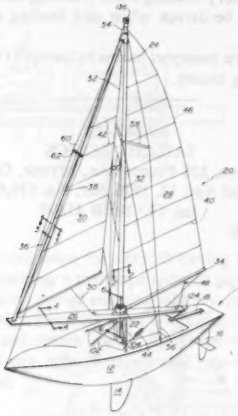
AUTOMATICALLY ROTATABLE SLOOP RIG

Robert L. Menegus, 62 Major St., Clifton, N.J. 07013

Filed Dec. 3, 1976, Ser. No. 747,162

Int. Cl.[2] B63H *9/04*

U.S. Cl. 114—102 **7 Claims**



1. An automatically rotatable sail rig for a sloop comprising:

a stiff step structure bedded to the hull of said sloop;

an upper main bearing on said step structure having a pair of upper and lower thrust bearings separated by a radial bearing;

a lower bearing on said step structure having a radial bearing;

a single vertical, tubular mast assembly mounted at its foot within said step structure;

said mast assembly supporting a battened cloth mainsail along its luff;

a substantially horizontal carrier boom freely rotatable about the radial bearing of said upper main bearing and hence freely rotatable about the vertical axis of mast assembly; said carrier boom having its angular span of free rotation limited by means of a line attached to the fore end of said carrier boom and attached to the hull along its centerline, said attachments being designed to permit the boat to be operated without adjusting sail sheets and said limiting line when making course changes, such as going about, jibing, changing from any tack to any other tack, and circling repeatedly, by manning only the helm or tiller;

a rotatable, tubular, inclined forespar assembly mounted at its lower extremity on the fore end of said carrier boom and at its upper extremity near the head of said mast assembly;

said forespar supporting a battened cloth jibsail along its luff;

a tubular mainsail boom to accomodate the foot of said mainsail;

the fore end of said mainsail boom being secured to said upper main bearing by a load spreader;

said step structure mounting said mast, said carrier boom, said forespar and said mainsail boom;

a vang to pull a weather-varying tension on the leech of said mainsail;

said vang being made fast at its extremities to said mainsail boom and to the lower bearing of said step structure;

a main sheet between said mainsail boom and said carrier boom to control the angle of said mainsail with respect to said rotatable carrier boom;

a coordinated system of multiple jib sheets made fast to said jib battens to shape the jibsail generally and to control the angle of said jibsail with respect to said carrier boom and to said mainsail;

a forestay set from the masthead to the nose of the hull to resist the horizontal moment of tension imposed on the leech of said mainsail;

a plurality of athwartships shrouds to support said mast assembly;

said forestay and said shrouds being flexibly anchored to said hull to permit free rotation of said spars, sails, vang, sheets, and carrier boom.

4,047,494

MEANS FOR STEERING JET DRIVEN WATER CRAFT

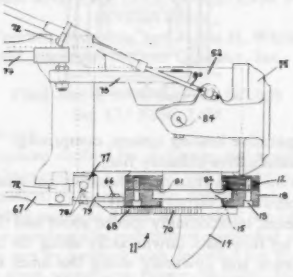
Albert Rockwood Scott, 287 Wychwood Ave., Toronto, Ontario, Canada

Filed Dec. 29, 1975, Ser. No. 644,540

Claims priority, application United Kingdom, Dec. 30, 1974, 55963/74

Int. Cl.[2] B63H *11/10*

U.S. Cl. 115—12 R **1 Claim**



1. In a water craft propelled by a jet of water discharged from its' stern and having a water outlet means rotatably mounted at the stern of the discharge housing of a water pump means for controlling the deflection of the jet of water to

starboard or to port of the stern of said craft, the combination comprising;

a water deflector rotatably mounted beneath said outlet and moveable therewith to direct said jet of water downwardly and forwardly of said craft;

a first gear member fixed to the lower side of said housing and intermeshing with and driving a second gear member fixed to said deflector thereby to allow said deflector to rotate about said outlet; and

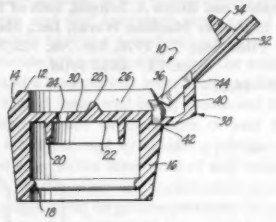
control means for rotating said outlet and said deflector together to provide a cumulative deflection forward of said craft from said deflector to allow water to discharge at an angle of at least 90° to the course of travel of said craft.

4,047,495

CHILD RESISTANT DISPENSING CLOSURES

Edward D. O'Brian, Anaheim, Calif., assignor to Polytop Corporation, Slatersville, R.I.

Filed May 3, 1976, Ser. No. 682,607
Int. Cl.² B65D *55/02*
U.S. Cl. 215—224 **4 Claims**



1. A container closure having a top with an opening extending therethrough, means for mounting said top on a container attached to said top and extending around said opening, hinge means secured to said top, a lid secured to said hinge means so as to be capable of being rotated between a closed position in which the lid overlies the top and covers the opening and an open position in which said opening is exposed in which the improvement comprises:

a recess having a bottom located in said top of said container,

a fulcrum located between said hinge means and said opening extending from the bottom of said recess upwardly into said recess,

said lid fitting within said recess when in its closed position so that said lid cannot be manually engaged to be lifted from said closed position,

overcenter toggle means connecting said lid and said top for controlling the position of said lid so that said lid is held by the action of said toggle means in either said closed or said open position, said toggle means being located adjacent to said hinge means,

said toggle means including a bell crank lever structure having ends, other hinge means pivotally connecting one of said ends of said lever structure to a side portion of said top and further hinge means pivotally connecting the other of said ends of said lever structure to said lid, said lever structure being capable of deflecting as said lid is moved between said open and said closed positions,

said toggle means being capable of responding to pressure applied vertically against said further hinge means when said lid is in said closed position so as to pivot said lid about said fulcrum to a sufficient extent so that said lid can be engaged to be further moved to said open position.

4,047,496

EPITAXIAL RADIATION HEATED REACTOR

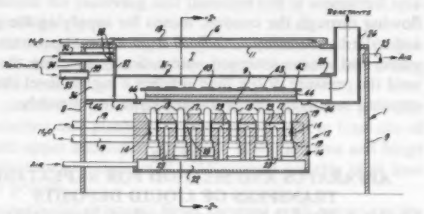
Michael A. McNeilly, and Walter C. Benzing, both of Saratoga, Calif., assignors to Applied Materials, Inc., Palo Alto, Calif.

Continuation of Ser. No. 475,051, May 31, 1974, abandoned, which is a continuation of Ser. No. 195,504, Nov. 3, 1971, abandoned, which is a division of Ser. No. 866,473, Oct. 15, 1969, Pat. No. 3,623,712. This application Aug. 25, 1975, Ser. No. 607,133

The portion of the term of this patent subsequent to Nov. 30, 1988, has been disclaimed.

Int. Cl.² C23C *13/08*

U.S. Cl. 118—49.1 **19 Claims**



1. A cool wall radiation heated reactor for effecting epitaxial and like chemical vapor deposition reactions therein on heated substrates positioned therein and heated thereby, comprising

A. a radiant heat source defined by a bank of a plurality of high intensity radiant heat lamps which together produce and transmit radiant heat energy of short wave length as a generally uniform non-focused radiant energy field,

B. means defining a reaction chamber, for receiving therein the substrates to be coated, positioned adjacent said heat source,

1. at least that portion of a wall of said reaction chamber which is positioned adjacent said heat source being formed from a material which is transparent to heat energy at the wave length produced by said heat source so that such radiant energy is transmitted through said wall without appreciable absorption thereby, whereby said wall remains cool and substantially free of film deposits during operation of said reactor,

C. susceptor means to be heated directly by said field of radiant energy emitted from said heat source, said susceptor means being positioned within said reaction chamber for supporting said substrates directly thereon in direct contact therewith during operation of said reactor,

1. said susceptor means including a susceptor body formed from a material which is generally opaque to said radiant energy and which absorbs the same and is generally uniformly heated thereby,

2. said susceptor body being positioned directly in line with said energy field emitted by said heat source for direct heating thereby over its full extent,

3. said susceptor body in turn uniformly heating and maintaining the temperature of said substrate substantially constant during operation of said reactor, and

D. conduit means for introducing gaseous reactants into said reaction chamber and for withdrawing spent reaction gases therefrom.

4,047,497

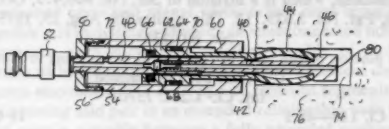
APPARATUS FOR IMPREGNATING CONSTRUCTIONAL ELEMENTS

Johannes Hermanus Grobler, 112 Valley View Road, Crest View, South Africa

Filed Jan. 26, 1976, Ser. No. 652,282
Int. Cl.² B05C *7/00*
U.S. Cl. 118—50 **1 Claim**

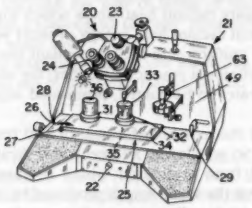
1. Apparatus for impregnating a constructional element with a fluid under pressure, the apparatus being of the type compris-

ing a conduit for conveying the fluid into a hole in the constructional element, a resiliently deformable sealing element, and a piston-and-cylinder assembly arranged to be actuated by the fluid to deform the sealing element to seal the conduit in the hole, a valve arranged to close to prevent the fluid from



flowing through the conduit, means for supplying the piston-and-cylinder assembly with fluid from a point upstream of the valve, and means arranged automatically to close the valve until the pressure of the fluid reaches a higher level than that required to actuate the piston-and-cylinder assembly.

4,047,498
APPARATUS AND METHOD FOR REPEATABLE TRANSFERS OF LIQUID DEPOSITS
Laurier A. Wood, 2 Vose Road, Westford, Mass. 01881
Filed Nov. 21, 1975, Ser. No. 634,048
Int. Cl.[2] B05C *1/02*
U.S. Cl. 118—243 **10 Claims**



1. Liquid transfer apparatus of the type having a source of coating, an applicator including a plunger movable within a housing and an arm supporting said applicator for movement between said source of coating and a work piece said apparatus characterized by

said source of coating including means for maintaining a layer of controlled, uniform, thickness of viscous coating, and

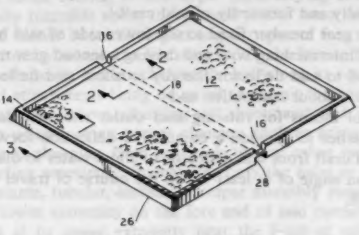
said plunger having a tip projecting beyond said housing adapted to pick up a layer of controlled thickness from said source and stamp said layer on said work piece, and having an enlarged rearward portion captive within, but axially slidable relative to said housing for stamping only with the force of gravity determined by the weight of said plunger.

4,047,499
PET WASTE DISPOSAL DEVICE
George Janecek, 1321 Scoville Ave., Berwyn, Ill. 60402
Filed Apr. 5, 1976, Ser. No. 673,701
Int. Cl.[2] A01K *29/00*
U.S. Cl. 119—1 **4 Claims**

1. A pet waste disposal device comprising:

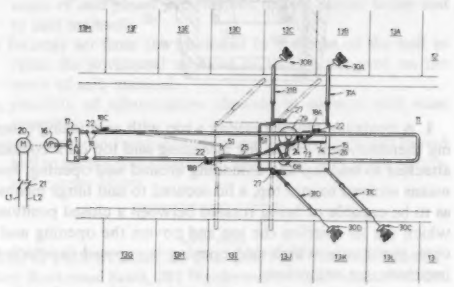
a. A substantially planar base, having a resilient intermediate portion comprising a thinner cross section than the remainder of said base, for receiving waste material from a pet standing thereon during use and foldable about said intermediate portion to form a pouring channel; and

b. A wall disposed about the periphery of said base extending above and below said base to prevent the waste material from escaping and to support the base, wherein said wall has notch means at opposite ends of said intermediate portion above and below said base to enable folding and to



provide an aperture for waste material passing along the pouring channel to exit from the device.

4,047,500
MILKING APPARATUS AND METHOD FOR OPERATING SAME
Lloyd F. Bender, and Rolyn A. Schmid, both of Hayward, Wis., assignors to Bender Machine Works, Inc., Hayward, Wis.
Filed Sept. 23, 1976, Ser. No. 725,785
Int. Cl.[2] A01J *9/08*
U.S. Cl. 119—14.11 **6 Claims**



1. Milking apparatus comprising:

a vacuum system including a main vacuum line installed along a plurality of milking stalls, a plurality of spaced-apart vacuum ports along said main vacuum line;

first valve means for selectively and independently opening and closing each vacuum port;

a mobile milking unit selectively movable from one position to another along said main vacuum line and said milking stalls, said unit comprising:

vacuum operated components on said milking unit including a plurality of teat claw assemblies for milking a plurality of cows simultaneously; and

a pair of flexible auxiliary vacuum lines on said milking unit, each auxiliary vacuum line having one end connected to operate all said vacuum operated components, each auxiliary vacuum line having its other end adapted for connection to a vacuum port in said main vacuum line, whereby at least one auxiliary vacuum line is always connected to said main vacuum line to permit continuation of milking as said mobile milking unit is moved from one position to another; and

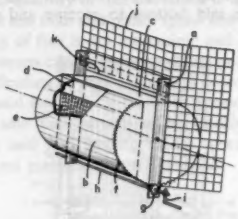
second valve means in each auxiliary vacuum line operative to close an auxiliary vacuum line whenever it is disconnected from a vacuum port.

4,047,501

DEVICE FOR KEEPING LIVE CHINCHILLA

Gaëtan Guibert, 9 Rue de Montesson, 95870 Bezons, France

Filed Mar. 17, 1976, Ser. No. 667,640
Claims priority, application France, Mar. 17, 1975, 75.08266
Int. Cl.[2] A01K *13/00*
U.S. Cl. 119—17 5 Claims



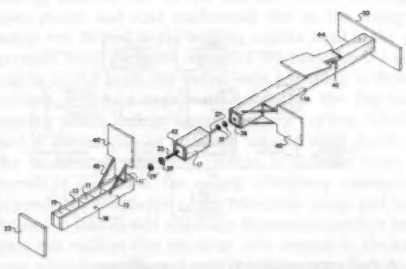
1. A device for keeping chinchilla adapted to be used in combination with a cage having a horizontal floor containing a chinchilla or similar animal, comprising a cylindrical container closed at its two ends by two respective side walls, and rotatably mounted with its axis in a horizontal position, said axis being substantially located in the plane defined by one of the sides of the cage and said container closing said side of the cage, said container having a peripheral wall with a longitudinal opening provided therein for allowing the animal to enter the container, and a longitudinal inner wall parallel to the axis of the container, said inner wall being connected by one of its longitudinal edges to one of the edges of said longitudinal opening of the container, and by at least a portion of its opposite longitudinal edge to the inner wall of said container, so as to define within the container one longitudinal small compartment and one longitudinal large compartment communicating with said longitudinal opening, said inner wall having a longitudinal imperforate portion adjacent said inner wall edges connected to said one edge of the longitudinal opening of the container, and a perforated portion coplanar with said imperforate portion and extending between said imperforate portion and the opposite end of the inner wall, said device further comprising positioning means for bringing said container into various preselected angular positions about said axis thereof.

4,047,502

HEAVY DUTY STANCHION

Melvin T. Gordon, Jr., 5107 Amberhill Drive, Greensboro, N.C. 27405

Filed May 24, 1976, Ser. No. 689,201
Int. Cl.[2] A01K *29/00*
U.S. Cl. 119—29 4 Claims



1. A collapsible, floor-to-ceiling stanchion comprising:

a. at least three segments including an upper segment having a top plate attached to the upper end thereof, a lower segment having a base plate attached to the lower end thereof, and at least one intermediate pivot section;

b. said pivot section being the shorter of said segments, with the walls of said three segments being substantially coplanar;

c. means for separably assembling said three segments in longitudinally aligned relationship with each segment being axially pivotal with relation to the adjacent segments, said assembly means including at least one threaded rod extending between said pivot section and one of the other two segments, said rod being secured within an end wall of one section and the adjoining end wall of the adjacent section having a threaded receiving means therein for receiving said threaded rod in assembled relationship;

d. said top plate having a length dimension of such magnitude as to extend across two adjacent beams of said ceiling when installed;

e. a plurality of platforms and a hinge structure for pivotally securing said platforms to the side walls of at least one of said upper and lower segments, said platforms and hinge structure so constructed as to support weights of at least 20 pounds,

f. each of said segments being covered with a traction imparting surface therearound;

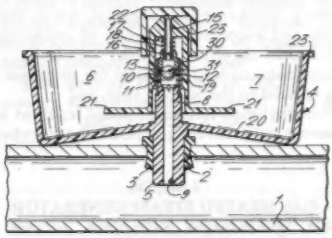
g. whereby, upon assembly, rotation of said pivot section changes the effective longitudinal dimension of said stanchion without the use of resilient force, and the large surface area of said top plate permits the axially applied force to be maximized to resist laterally applied forces without ceiling damage.

4,047,503

DRINKING STATIONS FOR POULTRY AND THE LIKE

Kenneth Wilmot, Clitheroe, England, assignor to Neotechnic Engineering Limited, Clitheroe, England

Filed May 4, 1976, Ser. No. 683,033
Claims priority, application United Kingdom, May 7, 1975, 19275/75
Int. Cl.[2] A01K *7/02*
U.S. Cl. 119—75 10 Claims



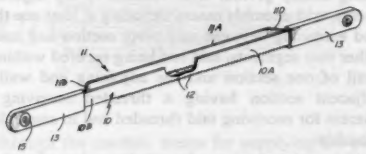
1. A drinking station for poultry or the like, the drinking station comprising a plurality of receptacles for receiving a drinking liquid, and valve means adapted to control the flow of the drinking liquid from a supply thereof into said receptacles, said valve means comprising a sleeve, a tongue extending laterally from said sleeve into one of said receptacles, and a valve-operating member projecting internally of said sleeve, said valve means being operable to supply the liquid to the receptacles in response to downward pressure on said tongue.

4,047,504

GROOMING IMPLEMENT FOR HORSES

Paul A. Borba, 626 Smith Neck Road, and Harry R. Miller, 751 Potomska Road, both of South Dartmouth, Mass. 02748

Filed July 12, 1976, Ser. No. 704,426
Int. Cl.[2] A01K *13/00*
U.S. Cl. 119—92 **10 Claims**



1. An animal grooming implement comprising relatively long and flexible blade means, and a pair of hand grips to which the blade means are connected, said blade means including first and second blades, corresponding edges of said blades including grooming teeth, means to space a central portion of one blade from the central portion of the other blade, said central portions normally straight and parallel, and means connecting one end of said first blade to said second blade so that it may slide relative thereto as the blades are curved by drawing the hand grips towards each other, said central portions remain parallel during use of the implement.

4,047,505

INSECT REPELLENT COLLAR

John Madden McAndless, Ottawa, Canada, assignor to Canada, Her Majesty the Queen in right of, as represented by the secretary of National Defence, Ottawa, Canada

Filed Aug. 2, 1976, Ser. No. 710,606
Int. Cl.[2] A01K *27/00*
U.S. Cl. 119—106 **7 Claims**

1. A collar for use in protecting exposed skin of a wearer's face and neck against biting insets which comprises:

a. a backing strip resistant to the passage of liquid therethrough having a fastening means at the ends thereof,

b. an absorbent layer adjacent the backing strip and being formed of an open-cell solid resin foam impregnated with a finely divided particulate absorbent material capable of absorbing liquid-repellent chemical which then slowly desorbs and evaporates, the rate of evaporation being controlled by the structure of the resin foam

c. a porous outer covering adjacent the absorbent layer and being secured to the backing strip, and

d. N, N-diethyl-meta-toluamide insect repellent applied to the porous outer covering adjacent the absorbent layer.

4,047,506

GAS HEATED STEAM GENERATOR

Max Weber, Wiesendangen, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 3, 1975, Ser. No. 637,399
Claims priority, application Switzerland, Dec. 6, 1974, 16222/74
Int. Cl.[2] F22B *1/18*
U.S. Cl. 122—32 **14 Claims**

1. A gas heated steam generator comprising

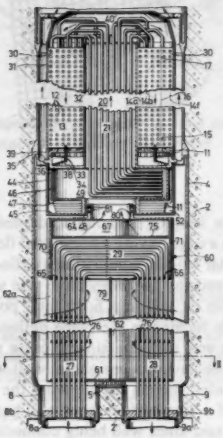
means defining a cylindrical chamber having a bottom and an inlet for a flow of heated gas;

an evaporator disposed in said chamber for evaporating a flow of feed water;

means for feeding water to said evaporator;

a superheater connected to said evaporator within said chamber for heating the flow of evaporated feed water to steam, said superheater being mounted in communication with said bottom to deliver steam from said chamber;

a reheater within said chamber, said reheater including a group of U-shaped tubes having a pair of vertically disposed spaced apart leg portions, said leg portions being mounted in said bottom to receive and conduct steam



from outside said chamber from one leg portion to the other leg portion;

a casing surrounding said group of U-shaped tubes, said casing having a pair of oppositely disposed openings communicating with said inlet; and

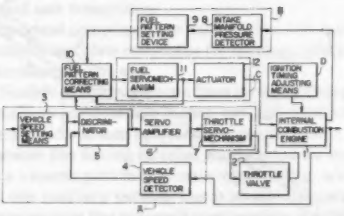
means directing the heated gas flows from said opening in two counterflows over each of said leg portions of said group of U-shaped tubes and subsequently over said superheater and said evaporator.

4,047,507

FUEL ECONOMIZING SYSTEM

Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyoto, and Nobuhito Hobo, Inuyama, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of Japan

Continuation of Ser. No. 530,974, Dec. 9, 1974, abandoned. This application Aug. 10, 1976, Ser. No. 713,208
Claims priority, application Japan, May 7, 1974, 49-50448
Int. Cl.[2] F02B *3/00*; F02M *39/00*
U.S. Cl. 123—32 Ea **10 Claims**



1. A fuel economizing system comprising:

constant speed control means for detecting the difference between the preset speed of a vehicle and the actual speed of said vehicle and for varying the opening of a throttle valve to reduce said difference to zero;

fuel pattern setting means for detecing the operating condition of an internal combustion engine and for setting the quantity of fuel to be required by said engine;

fuel pattern correcting means connected to said constant speed control means when said constant speed control means is in operation and to said fuel pattern setting means, said fuel pattern correcting means being adapted to correct said quantity of fuel to reduce it when said actual speed is not less than said preset speed and the variation of the quantity of fuel is not increasing; and

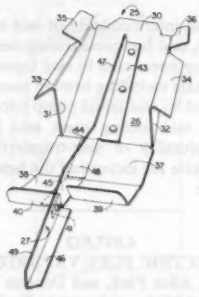
fuel feeding means connected to said fuel pattern correcting means for feeding to said engine the quantity of fuel corrected by said fuel pattern correcting means, wherein the output of said fuel pattern setting means is connected directly to said fuel feeding means when said constant speed control means is not in operation.

4,047,508

COOLING AIR DISTRIBUTION SYSTEM FOR RECIPROCATING AIRCRAFT ENGINES

George R. Schramm, Williamsport, Pa., assignor to Avco Corporation, Williamsport, Pa.

Filed Dec. 8, 1975, Ser. No. 638,978
Int. Cl.² F02F *1/34*
U.S. Cl. 123—41.6 **5 Claims**



3. In a reciprocating engine, the combination of:

at least two cylinders disposed side by side, each cylinder comprising a barrel and an enlarged head of bulging caplike contour, the barrel and the head being formed with groups of peripheral cooling fins, and

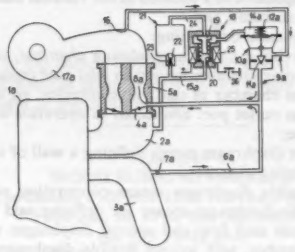
a cooling air distributor comprising a channel portion and a divider portion, the channel portion being formed with a runner and triangularly shaped wings transverse to the runner and terminating in flaps, the flaps being positioned closely adjacent the barrels and the runner forming an open mouth and next conforming first to the triangular wings and second to the bulging caplike head in the progression from the inner region of the barrel to the outer region of the head, the barrel-zone admitting orifices of cooling air being large with respect to the flap-barrel spacing which defines barrel-zone exit orifices, whereby part of the cooling air admitted via said open mouth and the barrel-zone admitting orifices is diverted from the barrels to the heads, the runner continuing substantially beyond the termination of the triangular wings and being formed so that its side edges are disposed to provide head-zone exit orifices that are large with respect to the head-zone admitting orifices, the divider being transverse to the channel portion and being formed with a triangular portion generally conforming to the wings and with a fin which substantially penetrates into the zone between heads.

4,047,509

METHOD AND DEVICE FOR RECIRCULATING EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

Henry Arnaud, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of France

Filed Apr. 29, 1975, Ser. No. 572,873
Claims priority, application France, May 16, 1974, 74.16996
Int. Cl.² F02M *25/00*
U.S. Cl. 123—119 A **4 Claims**



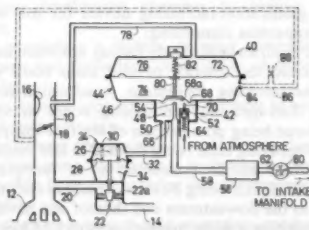
1. A method of recirculating the exhaust gases of internal combustion engines having an induction manifold, an engine power output adjustment throttle valve, and an exhaust system comprising the steps of, injecting exhaust gases from the exhaust system directly into the induction manifold, mixing atmospheric air with the exhaust gases to be injected into the induction manifold prior to said injecting step and adjusting the amount of air to be mixed with the exhaust gases prior to said mixing step to thereby control indirectly the metering of the amount of recycled exhaust gases without passing recycled exhaust gases through a gas recirculation control valve wherein said mixing step is carried out by providing an adjustable output induction air circulation in parallel with the induction manifold and wherein said injecting step is carried out by injecting the mixture of exhaust gases and atmospheric air just upstream of the throttle valve to provide atmospheric pressure at the output of the air circulation at engine idling speed.

4,047,510

EXHAUST GAS RECIRCULATION SYSTEM WITH CONTROL APPARATUS FOR EXHAUST GAS FLOW CONTROL VALVE

Yasuo Nakajima, Yokosuka; Yoshimasa Hayashi, Yokohama; Yasuo Takagi, Yokohama; Kunihiko Sugihara, Yokohama, and Syunichi Aoyama, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed June 19, 1975, Ser. No. 588,239
Claims priority, application Japan, June 27, 1974, 49-73704
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculation system for use on an internal

combustion engine having an intake system and an exhaust system comprising:

a recirculation conduit to recirculate a portion of exhaust gas from the exhaust system of an internal combustion engine to an intake system having a carburetor and an intake manifold;

an exhaust gas flow control valve normally closing said recirculation conduit;

a valve actuator including a vacuum chamber and a diaphragm operatively connected to said exhaust gas flow control valve to urge said exhaust gas flow control valve toward its open position so as to open said recirculation conduit responsive to a vacuum in the vacuum chamber of said valve actuator; and

a control apparatus comprising:

a housing having a vacuum regulating chamber, said vacuum regulating chamber having an inlet port connected to the vacuum chamber of said valve actuator, an air bleed port and an outlet port connected in operation to a vacuum source;

a first flexible diaphragm means defining a wall of said vacuum regulating chamber;

a second flexible diaphragm means cooperating with said first flexible diaphragm means for defining said housing and between said first and second diaphragm means a biasing chamber, said second flexible diaphragm means forming on the opposite side of a side exposed to said biasing chamber and in said housing a venturi vacuum chamber communicating with the venturi of the carburetor;

means mechanically interconnecting said first and second flexible diaphragm means;

said first diaphragm means having a valve portion engageable with said outlet port, said first diaphragm means being movable in increase and decrease of pressure in said vacuum regulating chamber to bring said valve portion into out of closing engagement with said outlet port;

said second diaphragm means having an effective area larger than that of said first diaphragm means;

an air bleeder valve means for opening said air bleed port in response to further flexing of said first diaphragm means due to increase of vacuum in said vacuum regulating chamber after closing of said outlet port;

a vacuum conduit having an air bleeder orifice, said vacuum conduit connecting said biasing chamber with the intake manifold, and said air bleeder orifice having a restriction chosen such that a vacuum in said biasing chamber is a reduction of a vacuum in the intake manifold and is lower than a vacuum in said venturi vacuum chamber.

4,047,511

PERFECT FUEL GASIFICATION DEVICE FOR USE IN COMBINATION WITH A COMBUSTION APPARATUS OF INTERNAL COMBUSTION ENGINE

Kazumi Takagi, Fuji, Japan, assignor to Takagi Sangyo Kabushiki Kaisha, Fuji, Japan

Filed Nov. 26, 1974, Ser. No. 527,233

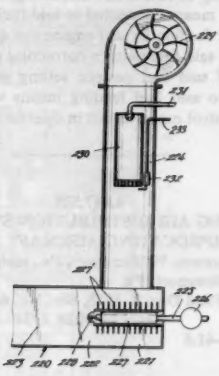
Claims priority, application Japan, Dec. 1, 1973, 48-139247

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 G **2 Claims**

1. A fuel gasification-increasing device for use with fuel-combustion apparatus comprising:

a hollow, cylindrical main body having upstream and downstream ends, the interior of said main body including intercommunicating fuel-intake, combustion-air supply, heating, fuel-spraying and mixing zones in series, the mixing zone being downstream of the fuel-spraying zone, said fuel-spraying zone being defined in said main body by a liquid-fuel nozzle connected to a fuel-pressurizing means, said nozzle being directed axially in said main body toward to the downstream end thereof and having means for discharging a wide, pressurized-spray of fuel as a mist into said main body toward said downstream end, said combustion-air supply means including means for heating and forcing combustion-air into said main body into said mixing zone so that the pressurized fuel mist is substantially perfectly gasified upon entering pressurized, increased-temperature combustion-air whereby the fuel-air using combustion apparatus receives gasified fuel in an optimum condition, said combustion-air supply means comprising a vertically-extending conduit communicating with said main body, blower means connected to an upper portion of said air conduit, and pre-combustion means in



said air conduit intermediately of said blower means and the main body, said fuel-pressurizing means comprising an hydraulic pump connected to said liquid-fuel nozzle, said liquid-fuel nozzle including heating means for heating the fuel pressurized by said liquid pump prior to the fuel being directed into said mixing zone, said liquid-fuel nozzle including a plurality of heat-transferring fins disposed about said nozzle for increasing the heat-conducting area of said nozzle.

4,047,512

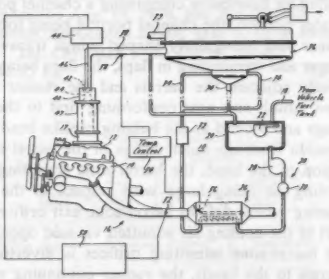
ELECTRIC FUEL VAPORIZER

Jerome F. Hough, Allen Park, and Douglas R. Hamburg, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 21, 1976, Ser. No. 699,003

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **9 Claims**



1. An electrically powered liquid fuel vaporizer system for vaporizing liquid fuel prior to its mixing with air comprising in combination:

a liquid fuel source, a plurality of electrically conductive fuel conduits arranged in side-by-side relation, each conduit having a liquid fuel receiving end and a vaporized liquid fuel outlet end, said liquid fuel receiving end communicat-

ing with said source of liquid fuel and arranged to receive a stream of said liquid fuel while excluding the atmosphere, said vaporized liquid fuel outlet end arranged for communication with a vapor storage means, while avoiding intermixing with the atmosphere, said conduits being mutually interconnected to form a thermally unitary body;

means defining a first electrical terminal in electrical contact with a first of the pair of ends of said plurality of fuel conduits;

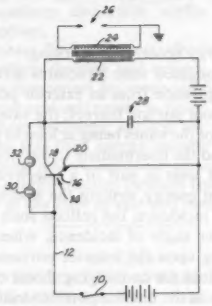
electrical circuit means for establishing a flow of electrical current through said plurality of fuel conduits between said first and second terminal means whereby the temperature of the plurality of fuel conduits may be elevated to cause substantially complete thermal vaporization of a liquid fuel flowing therethrough.

4,047,513

IGNITION SYSTEM WITH GAS DISCHARGE TUBE CIRCUIT

Guy Emery Adams, Monroe, N.Y., and Anna J. Pellegrin, Closter, N.J., assignors to Solitron Devices, Inc., Tappan, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,497
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 E **6 Claims**



1. A charging circuit for use in an electronic ignition circuit having an ignition coil controlled by a transistor, said circuit comprising:

a capacitor connected across the primary coil of the ignition coil and the collector and emitter of a switching transistor therefor; and

gas discharge tubes in a series circuit in parallel with said capacitor between a source of electrical energy and said primary coil, said tubes being between the collector and base of said transistor.

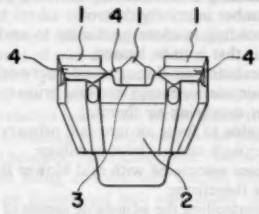
4,047,514

FURNACE TAPHOLE DRILLING BIT

Tsuyoshi Morishita; Kenji Miyake; Noboru Ishii, all of Hiroshima; Toshikazu Wakigara, Kure, and Naoji Ueda, Hiroshima, all of Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Oct. 12, 1976, Ser. No. 731,821
Int. Cl.² B28D 1/26
U.S. Cl. 125—40 **7 Claims**

1. In a drilling bit for use in making a taphole in a furnace which comprises a bit head of ferrous material and a plurality of cutting tips radially mounted on and soldered to said bit head in spaced relation to each other, the improvement wherein each of said cutting tips is made of a metallic material selected from the group consisting of super hard alloy and stellite and each of said tips is soldered to said bit head by a soldering material containing 3 to 5% by weight of carbon, 0.5 to 3.0% by weight of silicon and the balance iron, said percent by weight being based on the total weight of the composition,



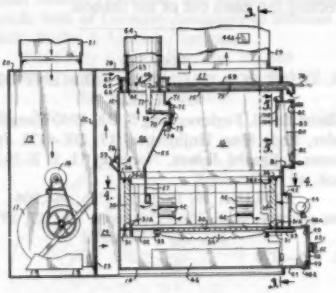
the sum of the carbon content and the silicon content in said soldering material being at least 4% by weight relative to the total weight of the composition.

4,047,515

WOOD BURNING FURNACE

Walter Lee Daniel, P.O. Box 1154, Harrison, Ark. 72601

Filed Jan. 16, 1976, Ser. No. 649,748
Int. Cl.² F24H 3/06
U.S. Cl. 126—110 R **7 Claims**



1. A firebox for a wood burning furnace, said firebox comprising:

a plurality of walls, a floor, and a ceiling integrally joined together to provide a substantially enclosed primary combustion chamber;

a fuel support frame located within said primary combustion chamber for supporting fuel therewithin;

a plurality of air inlet openings into said primary combustion chamber at a level above said fuel support frame, said inlet openings being oriented and arranged to direct air passing therethrough generally downwardly and inwardly within said primary combustion chamber toward the fuel on said fuel support;

a blower operable to force air through said inlet openings for combustion of the fuel;

a secondary combustion chamber communicating with said primary combustion chamber to receive combustion gases;

means presenting a bypass opening communicating said primary and secondary combustion chambers with one another;

a bypass damper supported for movement to open and close said bypass opening;

actuator linkage connected with said bypass damper to open and close same, said linkage including a control member accessible from the exterior of said primary combustion chamber;

a secondary air intake to said secondary combustion chamber for supplying ambient air thereto to effect further burning of the combustion gases; and

a flue outlet from said secondary combustion chamber for directing the gases out of the firebox.

5. A furnace comprising:

a firebox presenting a substantially enclosed primary combustion chamber interiorly thereof;

ductwork extending in close proximity to said firebox for receiving air that is to be heated;

means for circulating air through said ductwork;

a plurality of air inlet openings into said primary combustion chamber for supplying air thereto;

a blower operable to force air into said primary combustion chamber through said air inlet openings;

adjustable means associated with said blower for regulating the air flow therefrom;

a switch for controlling the adjustable means of said blower, said switch being located and adapted to sense the temperature within said ductwork and being coupled with said adjustable means to effect restriction of the air flow from said blower when the temperature in the ductwork exceeds a preselected reference temperature;

a secondary combustion chamber communicating with said primary combustion chamber to receive combustion gases;

a secondary air intake to said secondary combustion chamber for supplying air thereto to effect further burning of the combustion gases, said secondary air intake communicating with an air source; and

a flue outlet from said secondary combustion chamber for directing the gases out of the firebox.

4,047,516

PIPE JOINT FOR RADIATOR ELEMENT OF THIN MATERIAL

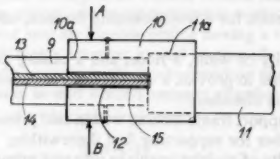
Per Wilhelm Bruel, Fuglevagsveig 5, DK-2960 Rungsted; Holger Schioler, Rode Hus, Hojbjergvej 17, DK-4171 Jystrup, and Johannes Tejlgaard Jensen, Norasvej 11, D K-2920 Charlottenlund, all of Denmark

Filed Dec. 29, 1975, Ser. No. 644,906

Claims priority, application Denmark, Jan. 17, 1975, 113/75

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **5 Claims**



1. A pipe joint for a radiator element, wherein the radiator element is a sheet of radiation absorbing material having a conduit passing therethrough in directions defined by the major surfaces of said sheet of radiation absorbing material, said conduit having a diameter essentially greater than the thickness of said sheet of radiation absorbing material and terminating at substantially right angles to an edge of said radiation absorbing material, said pipe joint comprising a block of deformable material adopted to be attached to said radiator element, said block being provided with a slot having a thickness substantially equal to the thickness of said sheet of radiation absorbing material, the bottom of said slot substantially conforming to said edge of said sheet of radiation absorbing material, said block being further provided with a first channel through said slot at substantially right angles to the bottom of said slot and having a cross-section substantially corresponding to the external dimensions of said conduit at the edge of said sheet of radiation absorbing material, said first channel passing through the bottom of said slot and terminating within the block beyond said slot, and said block being provided with a further channel through an edge of said block and communicating with said terminal end of said first channel, the surface area of the internal portions of said slot and said first channel being substantially greater than the internal surface area of said first channel.

4,047,517

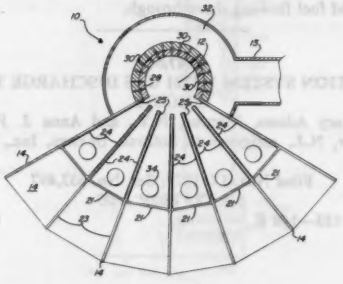
METHOD AND APPARATUS FOR RECEIVING SOLAR ENERGY

B. Thomas Arnberg, 2885 Kenyon Circle, Boulder, Colo. 80303

Filed July 6, 1976, Ser. No. 702,640

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **18 Claims**



1. A radiant energy receiver comprising:

a plurality of elongated vane structures arranged in a converging configuration from an exterior portion thereof to an interior throat portion thereof, the exterior to intermediate surfaces of the vanes being at least in part of a reflecting surface, and the intermediate to interior surfaces of the vanes being at least in part of a selective surface which absorbs radiant energy striking the selective surface at a small angle of incidence, but reflects such energy impinging at a greater angle of incidence, whereby radiant energy impinging upon the exterior portions of the vane is reflected towards the converging throat of the vanes and radiant energy in the interior portion striking the selective surface at a relatively small angle of incidence as would indicate incipient or actual reversal of direction of travel of the radiant energy relative to the vanes is absorbed while that striking the selective surface at a relatively large angle of incidence is reflected into the throat of the vanes to generate elevated temperature adjacent the throat of the vanes.

4,047,518

SOLAR HEATING CELL

John Harland Anderson, 5 Woodcrest Drive, Burnsville, Minn. 55337

Continuation-in-part of Ser. No. 449,761, March 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 390,852, Aug. 23, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,796

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **8 Claims**

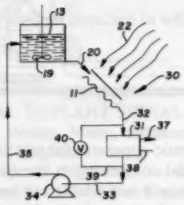
1. Solar energy gathering system including, in combination:

a. cell means including a generally solar transmissive enclosed fluid retaining zone with length and width dimensions substantially greater than the thickness dimension, and with an inclined flat plate disposed for solar viewing and forming one wall of said enclosure and having an inlet and an outlet for the transfer of fluid energy transfer medium therethrough, surface means including said flat solar transmissive plate comprising the solar viewing wall of said cell means, an opaque solar radiation responsive plate forming a backing plate for said cell means, and with

said solar viewing wall and said backing plate being arranged to support, retain and expose said fluid energy transfer medium contained therein to incident solar energy;

b. a fluid energy transfer medium arranged to flow through said cell and comprising a fluid normally in liquid state at ordinary ambient environmental conditions and being normally translucent;

c. a solar energy absorbing medium in substantially uniformly dispersed admixture with said fluid energy transfer medium and present in sufficient quantities so as to render said energy transfer medium as retained within said cell and between said solar viewing wall and said backing plate substantially opaque to incoming incident solar energy;



d. a dispersant in said fluid energy transfer medium for maintaining said solar energy absorbing medium in substantially uniform dispersion within said fluid energy transfer medium;

e. pumping means for forcibly transferring said fluid energy transfer medium through said system;

f. a heat extraction vessel for receiving fluid energy transfer medium from said cell means in liquid state and having at least one heat exchange surface for extracting thermal energy from said fluid energy transfer medium; and

g. said pumping means including means for recirculating spent fluid energy transfer medium from said heat extraction vessel to the inlet of said cell means.

4,047,519

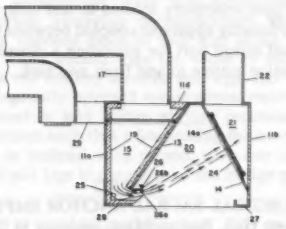
VENTILATING APPARATUS

Louis A. Nett, Box 199N Rte. No. 1, Cambridge, Wis. 53523

Continuation-in-part of Ser. No. 552,228, Feb. 24, 1975, Pat. No. 3,978,777. This application Sept. 2, 1976, Ser. No. 719,828

Int. Cl.² F24C *15/20*

U.S. Cl. 126—299 D **14 Claims**



1. Ventilating apparatus for ventilating a room which has tempered air introduced therein, exhaust apparatus comprising:

a. an exhaust hood having front, side and rear walls,

b. an interior wall which with the front wall and side walls of said exhaust hood defines an intake chamber within said exhaust hood, said interior wall and front wall converging downwardly,

c. a grease filter which with the rear wall and side walls of said exhaust hood defines an exhaust chamber within said hood,

d. said interior wall of the intake chamber and said grease filter of the exhaust chamber defining a fume collection chamber therebetween,

e. air intake means for drawing ambient air from outside the room being ventilated and forcing such air under pressure into said intake chamber,

f. a throat panel extending substantially along the length of the bottom of said interior wall,

g. a deflector panel also extending substantially along the length of the bottom of said front wall and positioned in spaced relation below said throat panel to form a longitudinally extending slot with said throat panel, the width of said slot being no more than about two inches, said deflector panel being continuously curved along its width to deflect air introduced into said intake chamber through said slot rearwardly and upwardly through said grease filter and into said exhaust chamber, and

h. exhaust means for drawing air and fumes out of said exhaust chamber and exhausting such air and fumes into the atmosphere outside the room being ventilated, said exhaust means having capacity to exhaust a minimum of 20% more air by volume than introduced into said intake chamber by said air intake means.

4,047,520

ULTRASONIC IMAGING APPARATUS OPERATING ACCORDING TO THE IMPULSE-ECHO TECHNIQUE

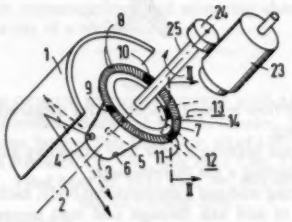
Richard Ernst Soldner, Erlangen, and Rudolf Rattmann, Herzogenaurach, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 6, 1976, Ser. No. 702,589

Claims priority, application Germany, Aug. 5, 1975, 2534974

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 V **14 Claims**



1. In ultrasonic imaging apparatus operating according to the impulse-echo method, and including an ultrasonic applicator for causing ultrasonic beam energy to effect ultrasonic scanning of a body region along successive scanning lines, an image registering device with a line generator for controlling the imaging of echo impulses along an image line and with an image generator for controlling image line displacement of successive image lines to form an image during displacement of the ultrasonic beam energy for scanning along successive scanning lines of the body region, said ultrasonic applicator comprising a parabolic reflector and ultrasonic transducer means operable for the transducing of ultrasonic beam energy relative to the successive scanning lines via successive points along border zones and along an intervening central zone of the parabolic reflector during rotation of the transducer means about the focal line of said reflector, and angle responsive signal generator means responsive to the angular movement of the ultrasonic transducer means and operable for controlling the image generator to produce image line displacement at a more rapid rate during transducing of ultrasonic beam energy via points at the border zones of the reflector and at a relatively slower rate during transducing of ultrasonic beam energy via points in the central zone of the reflector, wherein the improvement comprises said angle responsive signal generator means including rotary mark carrier means having a succession of angularly offset marks, and rotatable in synchronism with

the rotation of the ultrasonic transducer means, and mark scanner means operably associated with the marks of said mark carrier means for generating mark signals in response to the scanning of the successive marks during rotation of said mark carrier means, the marks of said rotary mark carrier means having a variable spacing such that the mark scanner means scans a relatively rapid succession of marks during transducing of the ultrasonic transducer means via points in the border zones of the reflector and scans a relatively less rapid succession of marks during transducing via points in the central zone of the reflector, and said mark scanner means being operatively connected to said image generator for controlling the rate of image line displacement in accordance with the rate of scanning of said marks by said mark scanner means.

4,047,521

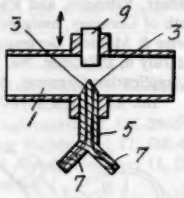
RATE-OF-FLOW METER, PARTICULARLY FOR DIAGNOSTIC SPIROMETRY

Carl Kramer, Am Chorusberg 8, 51 Aachen, and Hans-Joachim Gerhardt, Ruhrstrasse 12, 5023 Lovenich, both of Germany

Filed Nov. 4, 1975, Ser. No. 628,701

Int. Cl.² A61B *5/08*

U.S. Cl. 128—2.08 **11 Claims**



1. A rate-of-flow meter, particularly for diagnostic spirometry, comprising:

a. wall means defining a flow tube extending along an axis for conducting a gas therethrough;

b. a measuring stud and a displacement body, each extending radially of said axis through said wall means from the exterior to the interior of said flow tube, said measuring stud and displacement body passing through said wall means at diametrically opposite sides of said flow tube such that the respective ends of said measuring stud and displacement body are in spaced confronting relationship, the space therebetween being substantially less than the interior cross-sectional width of said flow tube and the cross-sectional widths of said measuring stud and displacement body being substantially less than the interior cross-sectional width of said flow tube such that resistance to flow through said flow tube is minimized;

c. the confronting end of said displacement body terminating in at least one knife edge, and the confronting end of said measuring stud terminating in a longitudinally extending knife edge oriented in a direction substantially perpendicular to said axis;

d. at least two symmetrically disposed orifices in said measuring stud at opposite sides of said longitudinally extending edge respectively and ducts extending through said measuring stud from said orifices for transmitting the pressure differential on opposite sides of said edge of said measuring studs; and

e. means for displacing one of said displacement body and measuring stud relative to the other in a direction normal to said axis whereby the magnitude of the increase in velocity of flow between said end of said measuring stud and said end of said displacement body can be varied.

4,047,522

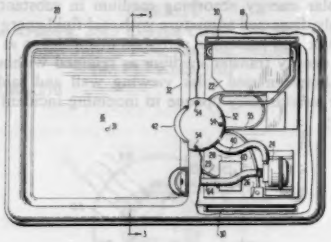
HYDROTHERAPEUTIC APPARATUS

Jerome R. Plugge, Rte. 50,, Skipton, Cordova, Md. 21625

Filed July 14, 1976, Ser. No. 705,252

Int. Cl.² A61H *9/00, 33/00*

U.S. Cl. 128—66 **15 Claims**



1. Hydrotherapeutic apparatus for treating the limbs such as the legs of an animal comprising in combination:

a unitary and easily transportable tub body including a tank for receiving at least one limb of said animal and a compartment for accommodating circulating and refrigeration apparatus;

said tank being of a selected size and shape to permit easy ingress and egress of said limb as well as allowing certain freedom of movement of said animal within said tank without injury to itself while preventing any overturning of said tank or other damage to said apparatus;

said tank further having a wall including a liquid input port therein for supplying a circulating liquid;

a liquid refrigerant evaporator unit and an outer casing member within which said evaporator unit is located mounted on said wall, said outer casing member having an end defining an opening adjacent said input port for receiving said circulating liquid supplied thereto and an opening in said casing member adjacent to the other end thereof for feeding circulating liquid passing said evaporator unit into said tank;

refrigeration apparatus including condenser and compressor means coupled to said evaporator unit for cooling said circulating liquid as it passes through said outer casing member from said input port to said opening in said casing;

a return port selectively located in said tank; and

liquid circulating apparatus coupled between said input port and said return port for providing a closed circuit liquid circulation system to and from said tank.

4,047,523

SURGICAL SACRAL ANCHOR IMPLANT

John Emmett Hall, Boston, Mass., assignor to Downs Surgical Limited, Mitcham, England

Filed Apr. 26, 1976, Ser. No. 680,232

Claims priority, application United Kingdom, Apr. 28, 1975, 17610/75

Int. Cl.² A61F *5/00*

U.S. Cl. 128—69 **14 Claims**

1. In a surgical implant capable of securing a spinal tensioning cable to the sacrum, the improvement wherein said implant comprises two laminar and substantially coplanar prongs which are sized and shaped for insertion into a spinal disc space and are rigidly secured together at their bases by a bridge portion which extends away from the prongs in a direction that makes an angle of not more than 90° with the plane of the

prongs and on the side on which the prongs lie, and means for securing to the bridge portion a spinal tensioning cable extending substantially in the said direction in which the bridge portion extends.

4,047,524

SURGICAL IMPLANT SPINAL STAPLE

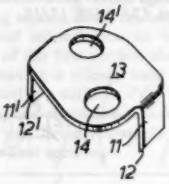
John Emmett Hall, Boston, Mass., assignor to Downs Surgical Limited, Mitcham, England

Filed Apr. 26, 1976, Ser. No. 680,233

Claims priority, application United Kingdom, Apr. 28, 1975, 17611/75

Int. Cl.[2] A61F 5/00; A61B 17/18

U.S. Cl. 128—69 **6 Claims**



1. A metal spinal staple substantially U-shaped in side view and capable of securing a pair of metal tensioning cables to a vertebra via spinal screws, which comprises:

a pair of substantially parallel, perpendicularly offset laminar legs having free ends which are bevelled on the outer surfaces to terminate in a wedge shape, the parallel distance between said legs being such as to fit snugly over either side of a vertebra;

an integral, substantially solid and rectangular laminar bridge portion extending perpendicularly between the diagonally opposed bases of said legs along its length, having a width greater than the width of each leg and having curved corners between said legs; and

a pair of diagonally opposed spinal screw receiving apertures formed in said bridge portion proximate to said curved corners such that a line joining the centers of said apertures is inclined with respect to a line joining the centers of said legs in the plane of the bridge portion.

4,047,525

INHALATOR FOR AGGLOMERATABLE PULVERULENT SOLIDS

Gerhard Kulessa, Stollberg, and Elmar Mommertz, Laurentsberg near Aachen, both of Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Jan. 13, 1976, Ser. No. 648,680

Claims priority, application Germany, Jan. 17, 1975, 2502251

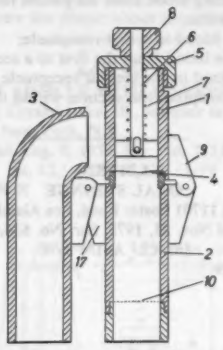
Int. Cl.[2] A61M 15/00

U.S. Cl. 128—208 **19 Claims**

1. An inhalator suitable for the administration of agglomeratable pulverulent solids, said inhalator comprising:

a container having a volume of about 1 to 100 ml for pulverulent solids and sealed at one end, and means associated with the other end of said container for expelling powder of a predetermined maximum particle size from said container, said means including a porous distributor plate having a pore size of 5–100 microns;

an atomizing chamber having a volume of about 5 to 100 ml, open at one end, said one end of said atomizing chamber being removably attached to said other end of said container for receiving said powder expelled through said porous distributor plate, said atomizing chamber containing at the other end thereof a porous retention plate, the pores of said retention plate being sufficiently smaller than the pores of said porous distributor plate so as to retain said expelled pulverulent solids in said atomizing chamber; and



means for communicating said atomizing chamber with an oral cavity of a recipient.

4,047,526

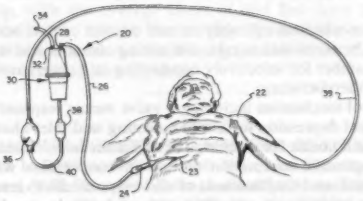
AUTOLOGOUS BLOOD SYSTEM AND METHOD

Gordon S. Reynolds, Bountiful; Karl A. Pannier, Jr., and James L. Sorenson, both of Salt Lake City, all of Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah

Filed May 22, 1975, Ser. No. 580,087

Int. Cl.[2] A61M 5/00

U.S. Cl. 128—214 R **28 Claims**



8. An autologous blood collection system comprising a closed extracorporeal blood circuit for collecting a patient's blood and delivering the collected blood to the same patient, the blood circuit comprising:

means for aspirating blood from the patient;

first means for collecting the aspirated blood, said first collecting means communicating with the aspirating means and means for continuously imposing a negative pressure in the first collecting means sufficiently to accommodate continuous aspiration of the blood;

second means for collecting the aspirated blood, said second means comprising third means for transferring the blood in the first collecting means into the second collecting means by overcoming the continuous negative pressure in the first receptacle; and

fourth means between said first means and said second means for facilitating infusion of blood into the patient from the second collecting means without interrupting the continuous evacuation of the first collecting means.

15. A method of collecting blood from a patient and infusing the same blood back into the patient, comprising the steps of:

providing a closed extracorporeal blood circuit through which blood passes;

creating suction within a blood aspiration device and selectively aspirating blood from the patient through the blood aspiration device;

depositing the blood in a first receptacle;

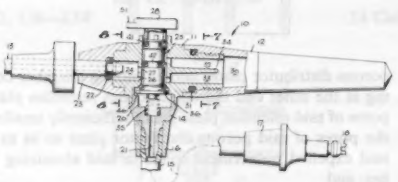
transferring the blood from the first to a second receptacle;

infusing the blood in the second receptacle into the patient without interrupting the suction within the blood aspiration device.

4,047,527
ORAL SYRINGE

Arthur F. Kelsen, 11701 Foster Road, Los Alamitos, Calif. 90720

Filed Nov. 21, 1975, Ser. No. 634,023
Int. Cl.[2] A61M *3/00*
U.S. Cl. 128—229 **1 Claim**



1. An oral hydrotherapeutic syringe for

delivering a fluid carrier stream to the teeth for effecting the cleaning thereof and for massaging the gums, the combination comprising:

a syringe having a central body portion;

a handle detachably connected to said body portion and provided with a mixing chamber for storing a quantity of mouthwash;

a nozzle detachably connected to said body portion for discharging said main carrier stream;

an attachment portion including an inlet chamber coupled to a source of pressurized fluid constituting said main carrier stream;

a control mechanism operably carried on said central body portion between said nozzle, said mixing chamber and said inlet chamber for selectively conducting said main carrier stream therebetween;

said control mechanism including a valve means responsive to manual depression for interconnecting said inlet chamber to said nozzle for discharge of said main carrier stream and responsive to rotation thereof in cooperation with axial rectilinear displacement of said valve means to interconnect said mixing chamber with said nozzle simultaneously with said interconnected inlet chamber for a combined discharge of said mouthwash with said main carrier stream;

said valve means includes an elongated spindle mounted for rectilinear and rotary movement on said central body portion;

at least three seals carried on said spindle is fixed spaced apart relationship so as to define a pair of annular fluid conducting chambers between adjacent seals;

a first chamber of said pair operable in response to a first depression of said valve means to interconnect said inlet chamber with said nozzle and said mixing chamber;

a second chamber of said pair operable in response to simultaneous rotation and a second further depression of said valve means to interconnect said mixing chamber with said nozzle simultaneously with said interconnection between said inlet chamber and said nozzle via said first chamber;

stop means limiting said rectilinear movement of said valve means;

said stop means includes a projection carried on one end of said spindle releasably engageable with a lip provided on said central body portion so as to prevent depression of said valve means beyond said intercommunication of said inlet chamber with said mixing chamber and said nozzle;

said stop means further includes interference of a selected one of said seals with said central body portion to arrest movement of said valve means so as to close communication between said inlet chamber with said mixing chamber and said nozzle;

spring biasing means yieldably urging said selected seal into engagement with said central body portion; and

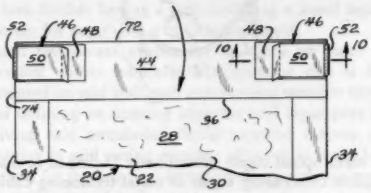
indicia displayed on said central body portion for mixing and no-mixing; and

said valve means having a pushbutton carried on said spindle incorporating a pointer operable with said indicia to visually display the rotational position of said valve means.

4,047,528
DISPOSABLE DIAPER WITH RETAINING AND SECURING FASTENER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 19, 1976, Ser. No. 715,782
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—287 **11 Claims**



1. A disposable diaper, comprising:

an absorbent pad assembly having a pair of side edges, a pair of end edges connecting the side edges, a front surface, a backing sheet of fluid impervious material defining a back surface of the pad assembly, an absorbent pad, and a laterally extending end section adjacent one end edge of the pad assembly; and

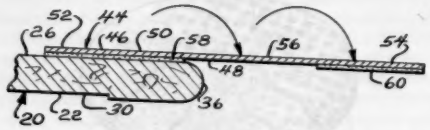
a tape fastener comprising, a release sheet having a release back surface and being attached to the back surface of said end section adjacent a side edge of the pad assembly, a securement section having adhesive on a front surface releasably attached to the back surface of the release sheet and having a release back surface, and a retaining section having adhesive on a front surface releasably attached to the back surface of the securement section, said retaining section being peeled from the securement section and folded around the side edge of the pad assembly into a configuration with the retaining section overlying the front surface of the pad assembly and with the adhesive on the retaining section facing away from the front surface of the pad assembly, said end section of the pad assembly being folded over an adjacent portion of the pad assembly into a configuration with the adhesive on the retaining section contacting a portion of the pad assembly underlying the end section and retaining the end section in the overlying configuration, and said securement section being peeled from the release sheet to secure the diaper about an infant.

4,047,529

DISPOSABLE DIAPER WITH UNITARY TAPE FASTENER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 19, 1976, Ser. No. 715,783
Int. Cl.² A61F *13/16*
U.S. Cl. 128—287 **7 Claims**



1. A disposable diaper, comprising:

an absorbent pad assembly having opposed surfaces, and at least one side edge; and

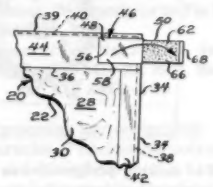
a tape fastener comprising, a tape strip having opposed front and back surfaces, first and second sections and a connecting section intermediate the first and second sections, said connecting section extending between a first fold of the tape strip located adjacent an inner end of the first section and a second fold of the tape strip located adjacent an inner end of the second section, with the back surface of the second section being folded against the back surface of the connecting section about the second fold, and with the connecting and second sections being folded over the back surface of the first section about the first fold, said first section having a release back surface and the front surface attached to a surface of the pad assembly adjacent said side edge, said second section having adhesive on the front surface and being releasably attached to the back surface of the first section.

4,047,530

DISPOSABLE DIAPER WITH FASTENER RETAINED END BARRIER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 19, 1976, Ser. No. 715,785
Int. Cl.² A61F *13/16*
U.S. Cl. 128—287 **5 Claims**



1. A disposable diaper, comprising:

an absorbent pad assembly having a pair of side edges, a pair of end edges connecting the side edges, a front surface, a backing sheet of fluid impervious material defining a back surface of the pad assembly, an absorbent pad, and a laterally extending end section including the backing sheet adjacent one end edge of the pad assembly, said end section being folded along a lateral fold line with a front surface of the end section facing the front surface of an underlying portion of the pad assembly adjacent said fold line; and

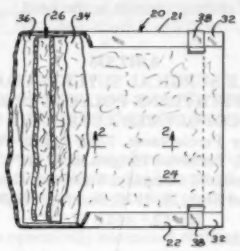
a tape fastener comprising, a release sheet having a release back surface and having a first end portion secured to the back surface of said end section and a second end portion secured to the back surface of the pad assembly and spaced from said end section, with said release sheet retaining the end section in its overlying configuration, said fastener having a pressure-sensitive tape strip having a first portion secured to the diaper adjacent said second portion of the release sheet, and a second securement portion releasably attached to the release surface in the first end portion of the release sheet, said securement portion of the tape strip being removed from the release sheet to secure the diaper about the infant.

4,047,531

ABSORBENT ARTICLE WITH DIFFERENTIAL PAD

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 713,086
Int. Cl.² A61F *13/02, 13/16*
U.S. Cl. 128—290 R **9 Claims**



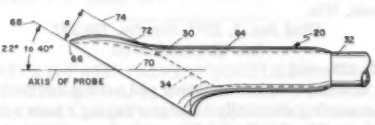
1. A disposable absorbent article of a size for placement against a wearer for capturing body fluids, comprising: a backing sheet of fluid impervious material, a fluid pervious cover sheet, and an absorbent pad positioned intermediate the backing and cover sheets, said pad comprising a plurality of separate layers including a first layer having a mass of fibers substantially formed from a material selected from the group consisting of mechanical pulp, thermomechanical pulp, and semichemical pulp, and a second layer having a mass of fibers substantially formed from a material different from the selected one of the first layer and selected from the group consisting of thermomechanical pulp, semichemical pulp, and chemical pulp, with the average fibers of said first layer being more hydrophobic relative the average fibers of the second layer, and with said second layer being located intermediate the first layer and said backing sheet.

4,047,532

VACUUM FORCEP AND METHOD OF USING SAME

Jack L. Phillips, 4929 Bancroft Drive, and Timothy E. Dickinson, 9458 Showplace Drive, both of La Mesa, Calif. 92041

Filed Apr. 21, 1975, Ser. No. 570,016
Int. Cl.² A61F *9/00*; A61B *17/00*
U.S. Cl. 128—303 R **13 Claims**



1. A vacuum forcep for attachment to a controlled variable vacuum source for temporarily holding an artificial lens and inserting the lens beneath the partially withdrawn cornea of the human eye and adjacent the iris, the forcep including

an elongated essentially straight hollow stem having a longi-

tudinal axis, the exterior of the stem defining a handle for manipulation by an operating surgeon, the stem being essentially rigid;

a flexible suction head having a shank portion disposed on one end of the stem and defining a cavity communicating with the hollow stem;

the suction head having a hollow face extending from the shank portion and communicating with the cavity in the shank portion and comprising a yielding, generally radially outwardly extending substantially annular lip of outside diameter less than that of the human cornea and a radial cross-sectional area greater than that of the shank portion, the face defining an angle greater than 0° and less than 60° with the extension of the axis of the stem past the face; and

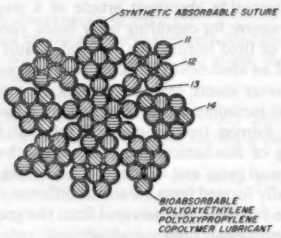
the suction head having a smoothly contoured rear surface on the side generally opposite from the face, whereby an artificial lens may be vacuum grasped by the face of the suction head, positioned with the eye beneath a partially withdrawn cornea and maintained in place until release is affected by abating vacuum in the head.

4,047,533

ABSORBABLE SURGICAL SUTURES COATED WITH POLYOXYETHYLENE-POLYOXYPROPYLENE COPOLYMER LUBRICANT

Vincent Anthony Perciaccante, Long Island City, and Henry Patrick Landi, Yorktown Heights, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sept. 20, 1976, Ser. No. 724,804
Int. Cl.² A61L *17/00*
U.S. Cl. 128—335.5 **23 Claims**



1. An absorbable surgical suture having improved knot run-down characteristics and reduced tissue drag comprising a polyfilamentary synthetic absorbable polymer strand having thereon a thin lubricating coating of a lubricating absorbable copolymer comprising polyoxyethylene blocks and polyoxypropylene blocks to aid run-down and handleability, said bioabsorbable copolymer having a molecular weight such that it is pasty to solid at 25° C.

4,047,534

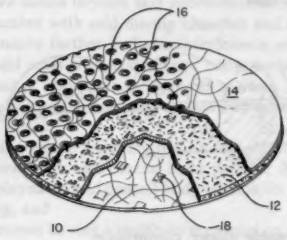
NURSING PAD

Susan N. Thomaschefsky, Menasha, and Ann Sprangers, Appleton, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jan. 3, 1977, Ser. No. 756,347
Int. Cl.² A41C *3/00*
U.S. Cl. 128—461 **7 Claims**

1. A flexible, breathable nursing pad having low stick properties, consisting essentially of, a layer having a basis weight of from about 0.2 oz/yd² to 1.5 oz/yd² of synthetic polymeric microfibers having an average fiber diameter of up to 10 microns and a tendency to cling to garments containing natural fibers and a resistance to the passage of aqueous liquids of at least 60 min. according to the Mason jar test, an absorbent middle layer comprising 30 to 50 polymeric fibers by weight and having a basis weight from about 150 g/yd² to about 250 g/yd², and

a spunbonded continuous synthetic polymeric filament layer having a basis weight of from about 0.25 oz/yd² to 1.5 oz/yd² on the other side of said absorbent layer opposite from said microfiber layer,



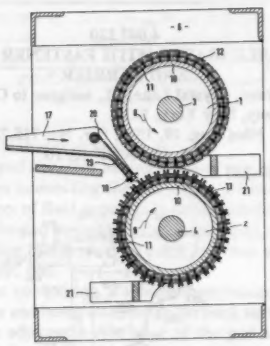
said combination being bonded by means of embossments wherein the embossing pattern on the microfiber side occupies from about 1% to 5% of the surface area and the embossing pattern on the continuous filament side occupies from about 10% to 20% of the surface area.

4,047,535

METHOD OF AND APPARATUS FOR IMPROVING SMOKING PROPERTIES OF TOBACCO PRODUCTS

Peter Wimmer, Wachtelweg 8, 4952 Barkhausen, Germany

Filed May 27, 1976, Ser. No. 690,519
Claims priority, application Germany, Mar. 29, 1976, 2613304
Int. Cl.² A24C *5/30*
U.S. Cl. 131—23 R **12 Claims**



1. A method of making perforations in tobacco products, such as cigars or cigarillos, comprising the steps of:

a. positioning said tobacco product in a channel secured on an external surface of a first cylindrical shell;

b. moving said channel by rotating said cylindrical shell about a longitudinal axis thereof;

c. contacting said tobacco product with a means for perforating said tobacco product, said perforating means being disposed on an external surface of a second cylindrical shell, said contacting performed by rotating said second shell about a longitudinal axis thereof in parallel and opposed relation to the rotation of said first cylindrical shell, whereby said perforating devices disposed on said second shell are brought into a position opposite said channel and perforations are made in the tobacco product positioned in said channel; and

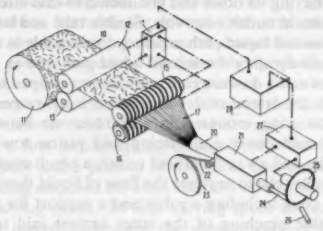
d. removing said tobacco product from said channel.

4,047,536

METHOD OF MAKING CIGARETTES AND A CIGARETTE MADE ACCORDING THERETO

Emil S. Asfour, Waugirain 21, 8704 Herrliberg, Switzerland

Filed June 16, 1975, Ser. No. 586,917
Claims priority, application Switzerland, June 19, 1974, 8366/74; May 20, 1975, 6473/75
Int. Cl.[2] A24B *1/02*
U.S. Cl. 131—140 C 2 Claims



1. An improved method of making a smoking article from an endless web of reconstituted tobacco having a mass per unit length substantially equal to that of the smoking article to be made, including the steps of advancing the web along a path of travel, working the web as it travels to modify the structure thereof transversely of its length, forming the worked web as it continues to travel into a continuous rod, applying a wrapping to the rod and cutting the rod into lengths equal to that of the smoking article, the improvement being characterized in that the working is accomplished by longitudinally grooving the web while preventing any substantial transverse contraction thereof to both form therein a plurality of closely spaced narrow longitudinal corrugations and laterally stretch the material of the web to form therein closely-laterally-spaced narrow zones of lesser thickness extending longitudinally of the web wherein the fibers of the web material are loosened and exposed to provide projecting fiber ends and a plurality of discontinuous longitudinal tears without substantially impairing the longitudinal continuity of the web.

4,047,537

PROCESS FOR GROOMING HAIR WITH A HAIR GROOMING AID CONTAINING FIBRILLATABLE POLYTETRAFLUOROETHYLENE RESIN

Glen A. Shaw, Lyndhurst, Ohio, assignor to The Harshaw Chemical Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 373,585, June 25, 1973, abandoned. This application May 23, 1975, Ser. No. 580,143
Int. Cl.[2] A45D *7/00*
U.S. Cl. 132—7 6 Claims

1. A method of grooming hair comprising:
a. introducing particles of fibrillatable polytetrafluoroethylene resin into and throughout the hair, and
b. fibrillating the resin by combing, brushing or rubbing at a temperature substantially above the temperature at which the resin fibrillates, but below the temperature at which the hair would be damaged, to form a network of fibers, invisible to the naked eye, throughout the hair effective to hold it in place.

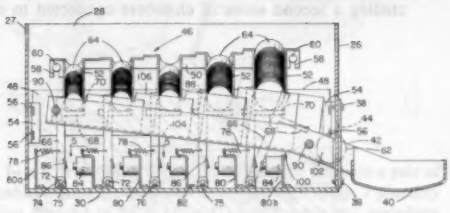
4,047,538

CHANGE DISPENSING APPARATUS

Ram N. Sahni, Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 8, 1975, Ser. No. 638,728
Int. Cl.[2] G07D *1/00*
U.S. Cl. 133—4 R 18 Claims

1. A change dispensing apparatus including in combination:
a. a coin channel orientated at an acute angle with a base plane and adapted to receive coins to be dispensed, said coin channel having a discharge end;
b. a coin chute adjacent the discharge end of the coin channel to support vertically orientated coins dispensed from the coin channel, said coin chute extending in a generally downward direction whereby coins will move along the chute on their edges by gravity;
c. a coin receptacle adjacent the end of the coin chute to receive coins deposited on the chute;
d. an actuator member adapted for movement to a dispensing position and located adjacent the discharge end of the coin channel, said actuator member having a coin support-



ing portion extending in a generally horizontal direction to support a coin on its edge when the actuator member is a non-dispensing position;
e. a vertically extending member mounted on said coin chute engaging and positioning the lowermost coin in the coin channel on said coin supporting portion of said actuator member;
f. and means operatively associated with said actuator member to selectively move the actuator member from a non-dispensing position to a dispensing position wherein said supporting portion moves to an inclined position to deposit the lowermost coin on the coin chute for movement to the coin receptacle.

4,047,539

METHOD FOR ESTABLISHING CORE-FLOW IN WATER-IN-OIL EMULSIONS OR DISPERSIONS

Vitold R. Kruka, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 21, 1973, Ser. No. 427,205
Int. Cl.[2] F17D *1/00*
U.S. Cl. 137—13 2 Claims

1. A method for breaking an emulsion of a viscous liquid and less viscous liquid and establishing core-flow of the viscous liquid inside an annulus of the less viscous liquid comprising subjecting the emulsion to a high shear rate by laminar conduit flow and maintaining the shear rate for a residence time of the emulsion in the conduit sufficient to cause migration of a substantial quantity of the less viscous liquid to the proximity of the conduit wall and there agglomerate to form the less viscous liquid annulus, and continuing flow in a conduit of larger diameter without substantially disrupting core-flow of the viscous liquid inside the less viscous liquid by diffusing and slowing flow from the emulsion-breaking conduit into the larger conduit by means of a diffuser having an angle ranging from about 1° to about 30°.

4,047,540

MULTI-PATH VALVE STRUCTURE HAVING EXTENDED LIFE AND BACKWASHING CAPABILITY

Myrl E. Orme, Canoga Park, and Ralph L. Vick, Granada Hills, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

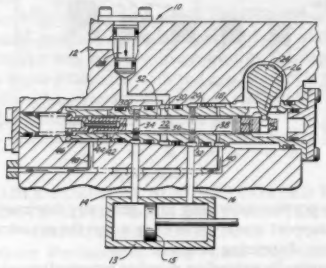
Filed Dec. 29, 1975, Ser. No. 644,393
Int. Cl.[2] F16K *47/08*; F15B *13/04*
U.S. Cl. 137—239 13 Claims

5. In a flow control valve wherein a spool valve member is

movable within a sleeve to open and close fluid passageways in said valve, a rigid structure forming part of said sleeve for dividing the flow entering and leaving said passageways into a plurality of streams comprising a stack of laminar disks having abutting faces and internal edge surfaces adjacent lands of said spool member,

said stack of disks including a first flow path across said stack, said first path including a first series of chambers connected to each other through a first series of orifices, thereby providing restricted flow in an inside to outside direction and substantial pressure drop across each of said orifices;

a second flow path across said stack, said second path including a second series of chambers connected to each



other through a second series of orifices, thereby providing restricted flow in an outside to inside direction and substantial pressure drop across each of said second series of orifices;

a third flow path across said stack directing a backflushing flow across said first series of orifices; and

a fourth flow path across said stack directing a backflushing flow across said second series of orifices, movement of said adjacent land a small increment from null in a first direction opening said first flow path and further movement in said first direction opening said fourth flow path, and movement of said land a small increment from null in a second direction opening said second path and further movement in said second direction opening said third flow path.

4,047,541

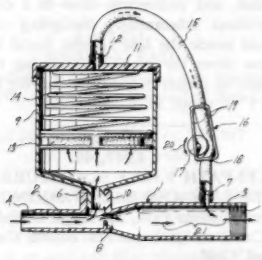
SHOWER HEAD LIQUID DISPENSER

Julien Mercier, 4181-45th Street, Apt. 6, Montreal, Quebec; Real Mercier, Terrebonne County, Mascouche, and Raymond Mercier, St. Anselme de Dorchester, all of Canada

Filed Apr. 15, 1976, Ser. No. 677,349

Int. Cl.² E03B *7/07*

U.S. Cl. 137—564.5 **1 Claim**



1. A shower head liquid dispenser comprising a tubular body forming a first liquid path extending from end to end of the tubular body and having an upstream portion of relatively smaller cross-section and a downstream portion of relatively larger cross-section, a liquid flow restricting internal lip projecting transversely of the tubular body into the first liquid path and located intermediate the upstream portion and the downstream portion of the tubular body, a lateral liquid outlet and a lateral liquid inlet communicating with said upstream and downstream portions, respectively, a liquid reservior having a neck at oen end removably screwed on said lateral outlet and a removable cover in fluid-tight engagement with the other end of said liquid reservoir, a flexible tube having one end in communication with the inside of said reservoir through said cover and having its other end connected to said lateral liquid inlet, said lateral outlet, reservoir, flexible tube and lateral inlet forming a second liquid path, a piston displaceable in the liquid reservoir and dividing the second liquid path into an upstream path section and a downstream path section in open communication with the lateral outlet and lateral inlet, respectively, a compression sring mounted in said reservoir between said piston and said cover and biasing said piston towards said lateral outlet and away from said cover, a pinch cock secured to said flexible tube to regulate the flow of liquid therethrough, said pinch cock including a roller and a support for the roller for adjustable pinching of the latter against said tube upon rolling of the roller along the support, so constructed and arranged that the flow of liquid along said first path produces relatively higher liquid pressure in the upstream path portion than in the downstream path portion of said tubular body which displaces the piston against the action of said spring to expel a liquid in the downstream section of the reservoir through the downstream section back into said tubular body through said lateral inlet.

4,047,542

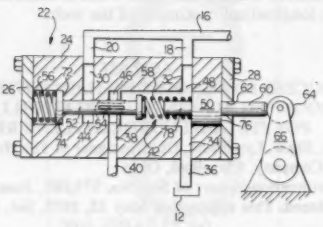
BYPASS VALVE

Czeslaw J. May, and Donald A. Piepho, both of Aurora, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 5, 1976, Ser. No. 655,336

Int. Cl.² F16K *11/16*

U.S. Cl. 137—627.5 **3 Claims**



1. A control valve comprising: a valve having inlet portion means comprising first and second inlet ports for communication with first and second branch conduits communicating with a source of fluid pressure, an outlet port adapted to communicate with a tank, and a working port, each port communicating with a bore defined by the valve body; first and second valving spools reciprocally positioned within the bore, the first valving spool being movable to a first position to provide communication between the first inlet port and the outlet port, and movable to a second position to block fluid communication between the first inlet port and the outlet port; and second valving spool being movable to a first position blocking fluid communication between the second inlet port and the working port, and movable to a second position providing fluid communication between the second inlet port and the working port; and means operatively connected with the first and second valving spools for providing that movement of the first valving spool from its first to its second position moves the second valving spool from its first to its second position, and movement of the first valving spool from its second to its first posi-

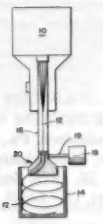
tion moves the second valving spool from its second to its first position, wherein the means operatively connected with the first and second valving spools comprise means for providing that the second valving spool provides communication between the second inlet port and working port subsequent to the blocking of fluid communication between the first inlet port and outlet port by the first valving spool, as the first and second valving spools are moved from the first to the second respective positions thereof, wherein the means operatively connected with the first and second valving spools comprise means for providing that the second valving spool blocks communication between the second inlet port and working port prior to the providing of communication between the first inlet port and outlet port by the first valving spool, as the first and second valving spools are moved from the second to the first respective positions thereof, wherein the means operatively connected with the first and second valving spools comprise a first helical spring disposed between the second valving spool and a portion of the valve body, and a second helical spring disposed between the first valving spool and the second valving spool, the first valving spool defining an arm extending therefrom toward the second valving spool, said means operatively connected with the first and second valving spools providing that upon initial movement of the first valving spool from its first toward its second position, the second valving spool remains in its first position relative to the valve body until said extending arm contacts the second valving spool, whereupon the first and second valving spools are moved further together against the resilience of the first helical spring.

4,047,543

GUIDE APPARATUS FOR DEFLECTING A LINEAR STRUCTURE

Burghard Burow, Radevormwald, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Mar. 25, 1976, Ser. No. 670,142
Claims priority, application Germany, Mar. 29, 1975, 2514072
Int. Cl.² F16L *9/14, 9/22*
U.S. Cl. 138—155 **9 Claims**



1. A device for deflecting a continuously supplied filamentary structure by means of a curved guide tube, said deflection device comprising:

a casing having an entry and an exit opening,

a plurality of contiguously abutting segments forming said guide tube which are disposed within said casing between its entry and exit openings, and

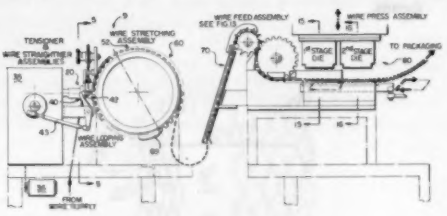
a bonding agent filling the space between the inner wall of said casing and the outer circumference of said segments.

4,047,544

WIRE FORMING APPARATUS

Paul Edward Seaborn, Los Gatos, and Kenneth Harold Dawson, Newark, both of Calif., assignors to The Mead Corporation, Dayton, Ohio

Filed Dec. 27, 1976, Ser. No. 754,243
Int. Cl.² B21F *1/04*
U.S. Cl. 140—105 **5 Claims**



1. In a wire forming apparatus of the type wherein a pair of rotatable wheels are disposed alongside each other, a plurality of pins secured to each of said wheels about the periphery thereof, and mounting means for rotatably supporting said wheels in such a manner that their axes of rotation are angularly disposed to each other, wherein the improvement comprise:

a. looping means disposed adjacent the peripheries of said wheels, said looping means being discontinuously rotatable in a single direction about a central axis, said central axis of said looping means being offset from and parallel to a plane defined by said plurality of pins secured to either of said wheels about the periphery thereof, said looping means intermittently engaging a strand of wire and imparting an undulatory configuration thereto; and

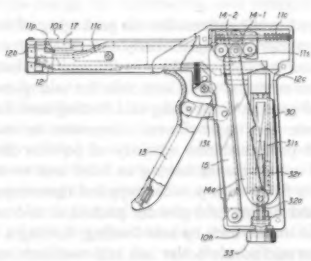
b. pushing means integrally disposed adjacent said looping means for transferring a looped strand of wire from said looping means to one of said pins on one of said wheels, said pushing means comprising at least two individual pushing members, said pushing means and said looping means being aligned and operating in cooperative relationship with one another.

4,047,545

INSTALLATION TOOL

Joseph R. Paradis, Wayland, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Continuation of Ser. No. 656,489, Feb., 1976, abandoned. This application Mar. 24, 1977, Ser. No. 780,724
Int. Cl.² B21F *9/02*
U.S. Cl. 140—123.6 **9 Claims**



1. A tool for tensioning an item having a free end, comprising

means for gripping and drawing the free end of the item;

means for severing an end portion of said item;

first and second pivotally connected links connected to the drawing means;

means for applying force to said drawing means through said first and second links to apply tension to the end of said item; and

means for maintaining said links in relative alignment until the applied force reaches a prescribed level whereupon said links pivot out of alignment and operate the severing means.

4,047,546

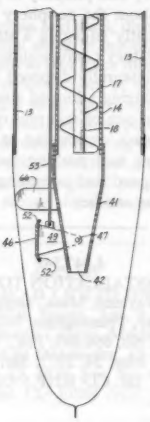
METHOD AND APPARATUS FOR FILLING CONTAINERS

Derrick Arthur Bassendale, Ancaster, and Derrick Bartram, Mississauga, both of Canada, assignors to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 322,523, Jan. 10, 1973, Pat. No. 3,879,917. This application Feb. 14, 1975, Ser. No. 549,854

Int. Cl.[2] B65B *1/04*

U.S. Cl. 141—1 R 21 Claims



1. Improved cyclic process for the packaging of dusty powders which comprises intermittently and repeatedly feeding a predetermined quantity of said powder, and discharging said quantity from an outlet into a container for said quantity, each cycle of said process comprising said feeding and discharging steps, wherein the improvement comprises, in each cycle, feeding said predetermined quantity of powder into nozzle means, said nozzle means having an inlet and an outlet and being already filled with powder supplied thereto previous to said cycle and having said powder packed at said nozzle and bridging said outlet, and, by said feeding, forcing a stream of powder from said nozzle outlet into said container, said nozzle outlet being narrower than said nozzle inlet and being sufficiently narrow that the powder becomes packed at said outlet and bridges said outlet preventing substantial further flow therefrom at the conclusion of each of said feeding steps while said nozzle means remains filled with said powder.

4,047,547

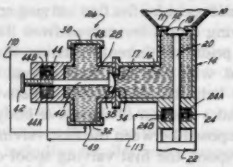
METHOD OF FILLING, SAMPLING AND SEALING AN ASEPTIC TANK

Steve A. Rechtsteiner, 1920 Gainsborough Lane, Cincinnati, Ohio 45230; Philip E. Nelson, 911 Garden St., and John R. Heron, 1016 Lindberg Road, both of West Lafayette, Ind. 47906

Division of Ser. No. 598,049, July 22, 1975, which is a division of Ser. No. 496,654, Aug. 12, 1974, Pat. No. 3,951,184. This application Mar. 22, 1976, Ser. No. 668,950

Int. Cl.[2] B65B *3/04*

U.S. Cl. 141—1 4 Claims



1. A method of aseptically sealing and sampling an aseptic storage tank containing sterile product comprising the steps of:

connecting first and second aseptic valves in series with an opening in the tank,

closing the first valve to seal the valve-closure cavity of the first valve from the tank opening to which a first port of the first valve communicates when the first valve is open,

introducing liquid chemical sterilant into the valve-closure cavities of the first and second valves to sterilize and establish first and second aseptic barriers between the tank opening and the environment,

closing the second valve to seal the second valve-closure cavity from the first valve-closure cavity,

unsealing a port in said second valve,

connecting a third valve to said unsealed port of said second valve to establish alternate flow paths including a) a first flow path between said unsealed port of said second valve and said environment and b) a second flow path between said unsealed port of said second valve and a sample container,

introducing liquid chemical sterilant into said second valve-closure cavity via said first flow path to sterilize said unsealed port of said second valve and said second valve-closure cavity,

operating said third valve to establish said second flow path, and

opening said first and second valves to permit sterile product from said tank to enter said sample container via said first and second valve-closure cavities and said second flow path.

4,047,548

VAPOR RECOVERY SYSTEM WITH SAFETY VALVE

Walter D. Wagner, Chaddsford, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Oct. 28, 1975, Ser. No. 626,418

Int. Cl.[2] B65B *3/04*

U.S. Cl. 141—52 2 Claims

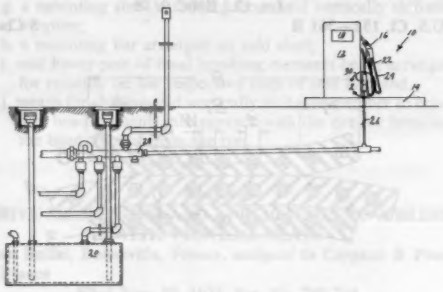
1. A system for dispensing hydrocarbons, and having a hydrocarbon vapor recovery system to prevent hydrocarbons displaced from a storage tank in a motor vehicle from being vented into the atmosphere, and designed to minimize the danger from fire or explosion in the event of an accident and comprising:

a. an underground facility for storing hydrocarbons displaced from a storage tank in a motor vehicle when the storage tank is being filled with liquid hydrocarbons;

b. a hydrocarbon dispensing station including a dispensing nozzle having a vapor recovery passageway for transport-

ing hydrocarbon vapors displaced from a storage tank in a motor vehicle;

c. means for transporting hydrocarbon vapors picked up by said dispensing nozzle to said hydrocarbon storage facility and including a pipe extending above ground at said hydrocarbon dispensing station and designed to transport vapors from the nozzle to said hydrocarbon vapor storage



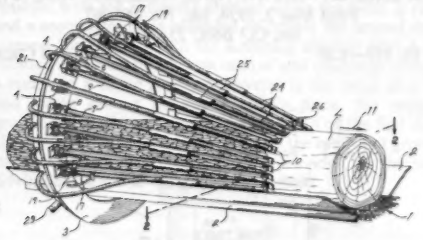
facility, and a valve means disposed in said pipe near the surface of the ground for sealing off the vapor recovery system in the event the pipe is accidentally damaged, whereby the sealing off of said pipe in the event of an accident minimizes the dangers of fire or explosion possibly caused by an open hydrocarbon storage system in the event of an accident.

4,047,549

LOG BARKING AND CLEANING MACHINE

Clement Ratelle, St. Laurent, and Pierre Rouillard, Repentigny, both of Canada, assignors to Clement Ratelle, St. Laurent, Calif.

Filed May 11, 1976, Ser. No. 685,353
Claims priority, application Canada, Aug. 21, 1975, 233871
Int. Cl.[2] B08B *3/00*; B27L *1/00*
U.S. Cl. 144—208 D **10 Claims**



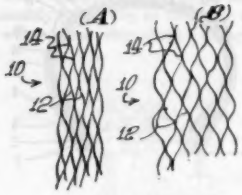
1. In a log barking and cleaning machine defining a path for endwise displacement of at least one log therethrough, the combination comprising a support structure extending transversely to the log path and adjacent the latter, arms pivoted to said support structure in planes extending longitudinally of the log path and intercepting the latter, spring means connected to said arms and inwardly biasing the latter toward operative engagement with a log conveyed endwise along the log path, a liquid jet nozzle secured to each of said arms and inwardly directed toward the log path, and a hydraulic supply system connected to said liquid jet nozzles and arranged to supply liquid under pressure to the latter.

4,047,550

PACKAGING WRAPPER

William A. Scholz, Ontario, Calif., assignor to Standun, Inc., Compton, Calif.

Filed Feb. 23, 1976, Ser. No. 660,421
Int. Cl.[2] B65D *65/02*
U.S. Cl. 150—52 R **1 Claim**

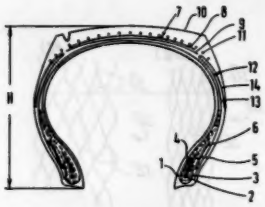


1. A packaging wrapper and article container combination comprising: a relatively rigid article container having an open side, such as a produce box; said article container being adapted to be filled with a multiplicity of relatively small articles; a stretchable net-like wrapper member conforming substantially to a hollow cap-like configuration and having a container receiving opening bounded by an edge of said member; said wrapper member comprising a multiplicity of flexible, non-absorbant, extruded monofilament plastic strands throughout, which are preformed to normally assume a generally rectilinear configuration and extend in the same edgewise direction of said member and transverse to said member edge throughout said edge; and the adjacent strands being joined to one another at relatively widely spaced junctions generally uniformly spaced along the strands with the junctions of each pair of adjacent strands located approximately midway between the junctions of each strand of said pair and its other adjacent strand; relatively small cross-sections of said strands, as compared to said relatively widely spaced junctions, defining adjacent offset circumferential rows of relatively large net openings encircling said container receiving opening and throughout said wrapper member, whereby said wrapper member is stretchable edgewise in a transverse direction of said strands to enlarge the dimensions of said member including the circumferential length of said edge in a manner which deflects said strands laterally into a sinuous configuration as permitted by said relatively large net openings wherein the strands store elastic strain energy for contracting said wrapper member in said transverse edgewise direction when the wrapper member is released; an elastic cord encircling said container opening in and secured to said edge of said wrapper member and having an unstretched circumferential length spaced less than a stretched circumferential length of said edge, said securement of said elastic cord to said edge of said wrapper member being substantially solely by said elastic cord being threaded through at least one row of said net openings adjacent said container receiving opening over and under said strands encircling said container receiving opening, whereby said elastic cord and said edge of said wrapper member are substantially independently stretchable except for said threaded securement; said wrapper member being positioned over said container open side with said independently stretchable wrapper member edge and threaded elastic cord encircling and stretchably gripping said container about its open side for retaining said multiplicity of relatively small articles in said container.

4,047,551
RADIAL TIRES PROVIDED WITH IMPROVED SIDEWALL-STIFFENING STRUCTURE

Mario Mezzanotte, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed July 14, 1976, Ser. No. 705,259
Claims priority, application Italy, Sept. 24, 1975, 27561/75
Int. Cl.[2] B60C 9/10, 9/18
U.S. Cl. 152—354 8 Claims



1. In a pneumatic tire for vehicle wheels comprising a radial carcass, a tread, a bead containing a bead cord and a breaker arranged between the carcass and the tread, the improvement wherein

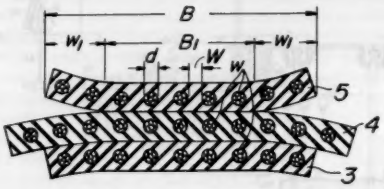
the carcass has at least one ply of cords lying in substantially radial planes, said cords extending from one bead to the other and being turned up about the bead core contained in each bead from the inner side towards the outer side of the tire, each bead comprising a filling of high rigidity rubber arranged on the core, the lower zone of each sidewall comprising at least one strip of metal cords arranged with said cords inclined at 90° with respect to the circumferential lines of the tire, in an axially outer position with respect to the turn-up of said carcass and extending radially from the core zone to at least a height equal to 45% of the section height of the tire, and

said breaker comprises at least two superimposed layers of cords of threads or wires of a material selected between textile or metallic material having a width corresponding at least to that of the tread, said breaker cords being parallel to one another in each layer and crossed with respect to those of the adjacent layer, and being inclined at an angle ranging between 10° and 35° with respect to the equatorial plane of the tire and, in a radially outer position with respect to said two layers, at least one strip of textile cords arranged in a direction parallel to the equatorial plane of the tire, having a width greater than that of said two layers, said textile cords being made of a material which reduces in length under the action of heat, characterized in that the tire also comprises, in each sidewall, a reinforcement made of a fabric of cords of threads or wires of a material selected between textile or metallic material, arranged in an axially outer position with respect to the carcass and to its turn-up in such a way that said cords, parallel to one another, are inclined, with respect to the circumferential lines of the tire, at an angle ranging between 20° and 30°, said reinforcement being so folded as to have a greater skirting extending from the bead core zone as far as the tire shoulders and a smaller skirting extending from the shoulder zone as far as one half of the section height of said tire, the folding edge of said reinforcement lying substantially adjacent to the layers of cords of threads or wires of a material selected between textile or metallic material of said breaker and underlying said strip of textile cords of the breaker itself.

4,047,552
PNEUMATIC RADIAL TIRE FOR HEAVY LOAD VEHICLES

Muneyoshi Maeda, Higashi-Murayama; Shigeo Watanabe, Kokubunji; Hidenori Takahashi, Tokorozawa, and Toshiyuki Sogi, Higashi-Yamato, all of Japan, assignors to Bridgestone Tire Company Limited, Kyobashi, Japan

Filed Aug. 6, 1976, Ser. No. 712,294
Claims priority, application Japan, Aug. 12, 1975, 50-97132
Int. Cl.[2] B60C 9/18
U.S. Cl. 152—361 R 5 Claims

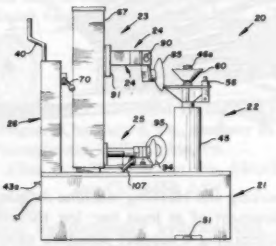


1. A pneumatic radial tire for heavy load vehicles comprising a carcass composed of ply cords lying in a radial plane of the tire or forming a very small angle with said plane and a belt for reinforcement of said carcass including tension members composed of at least two rubberized metal cords crossing with each other at a cord angle of not more than 25° with respect to the equatorial plane of the tire, characterized by coating said metal cords of said tension members with a rubber having a modulus of elasticity of 40–80 Kg/cm², and by widening a distance W between the cords in each of said tension members to 0.2–0.75 *d* based on a diameter *d* of said metal cord, and by uniformly shortening an interlaminar cord distance D between said tension members to 0.2–0.4*d* at a central region extending within 50–80% of a superposed width of said tension members, and by gradually separating said tension members with respect to each other from said central region toward both edges thereof.

4,047,553
TIRE CHANGING DEVICE

Wayne Kotila, 8317-28th Ave. North, Minneapolis, Minn. 55427

Filed May 2, 1974, Ser. No. 466,267
Int. Cl.[2] B60C 25/06
U.S. Cl. 157—1.24 8 Claims



3. A tire mounting and demounting unit including:

a. a longitudinally extending mounting base;

b. a tire rim mounting member arranged in generally horizontal overlying relation to said base and being rotatable with respect thereto;

c. a generally vertical carrier element arranged for longitudinal movement on said base for shifting the same with respect to said rim mounting member;

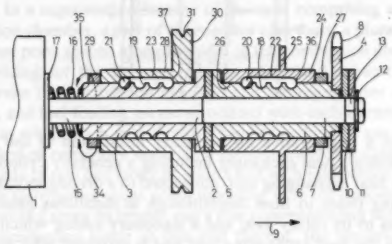
e. said carrier element including a vertically shiftable member;
f. bead breaking elements mounted on said vertically shiftable member including an upper bead breaking element vertically and rotatably positioned on said shiftable member and a lower pair of bead breaking elements which upper element and said lower pair of bead breaking elements will engage the opposite beads of a tire mounted on said tire mounting rim;
g. a mounting shaft extending from said vertically shiftable member;
h. a mounting bar arranged on said shaft;
i. said lower pair of bead breaking elements being arranged for rotation on the respective ends of said bar; and,
j. means for shifting said vertically shiftable member to bring said bead elements into contact with the tire for breaking the bead thereof from the rim.

4,047,554

DRIVE MECHANISM AND APPLICATION TO A BLIND WITH VERTICAL SLATS

Jean Bullat, Bonneville, France, assignor to Carpano & Pons, France

Filed Nov. 10, 1976, Ser. No. 740,714
Claims priority, application France, Nov. 17, 1975, 75.35559
Int. Cl.² E06B *9/30*
U.S. Cl. 160—168 R **5 Claims**



1. A drive mechanism comprising first and second rotatable driving elements kinematically connected to a common rotary actuating element respectively by a first coupling arranged to immediately couple the first driving element for a limited rotation with the actuating element when the latter is rotated and a second coupling arranged to couple the second driving element for rotation with the actuating element after a given rotation of the latter, wherein each of said couplings comprises a ramp and a facing groove transverse to the ramp, each ramp and facing groove housing a mobile piece, the ramp and groove of the first coupling being provided on the first driving element and a facing fixed surface, and the ramp and groove of the second coupling element being provided on the second driving element and the actuating element.

4,047,555

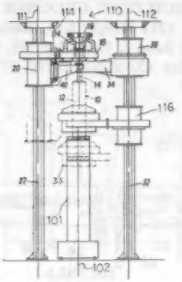
METHOD OF AND APPARATUS FOR POSITIONING CONSUMABLE ELECTRODES IN AN ELECTROSLAG REMELTING BATH

Gabriel Lamarque, Paris, France, assignor to Vereinigte Edelstahlwerke AG. (VEW), Vienna, Austria

Filed Sept. 22, 1976, Ser. No. 725,568
Claims priority, application France, Sept. 23, 1975, 75.29081
Int. Cl.² B22D *45/00*
U.S. Cl. 164—52 **7 Claims**

1. In an arrangement for transferring a consumable electrode to and from an underlying mold section positionable along a first vertical axis, first and second vertical masts disposed in spaced relation on generally opposite sides of the first axis and individually extending along second and third axes, first and second lift means respectively mounted for reciprocation on the first and second masts, the first lift means having a fixed portion extending generally transversely across the first axis toward the second mast, the fixed portion having a recess therein aligned with the first axis for receiving an electrode to be lowered into the mold and thereafter raised after consumption via a reciprocation of the first lift means, and a first electrode-transferring arm supported for oscillation on the second lift means toward and away from the first axis and cooperable with the recess in the fixed portion of the first lift means for selectively positioning an electrode in the recess.

6. In a method of vertically transferring an elongated consumable electrode having an integral collar thereon to an underlying mold section disposed on a a first vertical axis, the steps of releasably supporting an electrode to be transferred on a first arm which is movable along a second axis spaced from



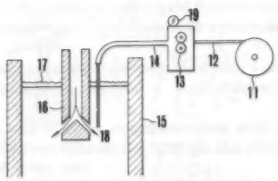
the first axis and oscillatable between the second axis and the first axis; separately supporting an electrode holder in vertically movable relation along a third vertical axis disposed on the opposite side of the first axis, the holder extending in horizontal intersecting relation to the first axis and having a recess aligned with the first axis in the path of oscillation of the first arm; moving the first arm vertically on the second axis until the collar of the engaged electrode is above the upper surface of the electrode holder; oscillating the first arm toward the first axis to position the electrode in the recess of the holder; lowering the first arm along the second axis until the collar abuts the upper surface of the holder and to disengage the electrode from the first arm; oscillating the now-empty first arm away from the first axis; and lowering the holder along the third axis to position the electrode engaged in the recess within the underlying mold section.

4,047,556

CONTINUOUS CASTING METHOD

Tatsuichi Obinata, Tokyo; Kaname Wada, Kisarazu; Shigeaki Ogibayashi, and Hironobu Mihara, both of Kimitsu, all of Japan, assignors to Nippon Steel Corporation and Hitachi Cable, Ltd., both of Tokyo, Japan

Filed Apr. 28, 1975, Ser. No. 571,973
Claims priority, application Japan, May 1, 1974, 49-48324
Int. Cl.² B22D *27/20*
U.S. Cl. 164—57 **11 Claims**



1. A method of producing steel comprising: continuously

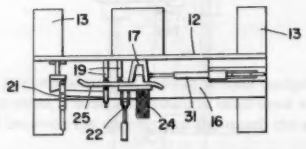
feeding an addition material in a wire form to molten steel in a mold for continuous casting at a predetermined feeding speed corresponding to a desired addition of the addition material, said addition material being composed of an addition metal in wire form and a covering metal thereon, said covering metal being a metal of low reactivity and having a thickness which dissolves at a predetermined depth in the molten steel, bringing the addition material in the wire form into contact with the molten steel, and dissolving the addition metal at a predetermined depth in the molten steel, said cover being made of a metal or alloy of low reactivity, having its side portions being overlapped with each other along its lengthwise direction, and tightly covering said addition metal.

4,047,557

ELECTROSLAG REMELTING APPARATUS FOR REBUILDING GROUSER BARS

James H. Wright, 1211 Wright Ave., Richmond, Calif. 94808

Filed June 1, 1976, Ser. No. 691,900
Int. Cl.[2] B22D *19/10, 27/02*
U.S. Cl. 164—252 **4 Claims**



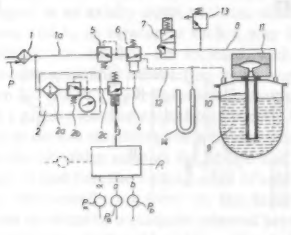
1. Apparatus for rebuilding worn grouser bars, including a support structure, a mold secured to said support structure, said mold having a cavity with the configuration of the outer surface of the original grouser bar and an outward opening, clamp means for securing a track plate to said support structure with said worn grouser bar disposed within said opening and extending into said cavity, consumable electrode welding means for filling the gap in said cavity between the surface of said grouser bar and the mold interior surface with molten electroslag metal; said mold including a base member secured to said support structure, a pair of opposed side members defining the laterally extending sides of the rebuilt grouser bar, and an end plate defining the lateral working end of said grouser bar, said side members and said end plate being secured to said base member.

4,047,558

METERING DEVICE FOR METAL CASTING MACHINES, PARTICULARLY LOW PRESSURE CASTING MACHINES

Winfried Kotthoff, Eversberg, and Wolfgang Wiedenroth, Meschede (Ruhr), both of Germany, assignors to Honsel Werke Aktiengesellschaft, Germany

Filed June 25, 1975, Ser. No. 590,276
Claims priority, application Germany, June 28, 1974, 2431108
Int. Cl.[2] B22D *11/16*; B22C *19/04*
U.S. Cl. 164—309 **2 Claims**



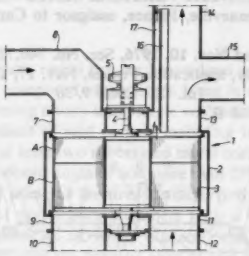
1. In a metal casting machine including a mold, a reservoir connected to the said mold, and gas pressure means connected to said reservoir for delivering molten metal from said reservoir to said mold, a pressure control device comprising a control valve, a pilot valve feeding said control valve with a predetermined gas pressure, and a conduit communicating said control valve with the pressure in said reservoir, said control valve functioning as a differential pressure valve to apply the difference in pressures across said control valve as a control for said gas pressure means.

4,047,559

REGENERATIVE AIR PREHEATER INSTALLATION

Frank Eskil William Asplund, and Axel Erik Konstantin Engstrom, both of Jarfalla, Sweden, assignors to AB Svenska Maskinverken, Jarfalla, Sweden

Filed Nov. 12, 1975, Ser. No. 631,022
Claims priority, application Sweden, Dec. 6, 1974, 7415304
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—7 **2 Claims**



1. In a regenerative air preheater installation of the kind comprising a heat exchanger including a generally cylindrical rotary heat exchanging unit, connected to a driving motor and allowing fluids to flow therethrough in directions generally parallel to its rotary axis, and a stationary casing which surrounds the heat exchanging unit and is provided with axially opposite inlets and outlets for combustion air and flue gas defining two axial passageways for combustion air and flue gas, respectively, extending through the rotary heat exchanging unit, each such passageway being connected with its inlet and outlet in a duct for conveying a flow of combustion air and flue gas, respectively, through the heat exchanger, a branch duct connected to the flue gas duct to allow flue gas to be drawn off from the flue gas duct through said branch duct for subsequent use as an inert gas, the improvement comprising means to conduct away from the flue gas outlet of the heat exchanger at least a major portion of any air passing from the combustion air passageway to the flue gas passageway during the operation of the heat exchanger, said branch duct being connected to the flue gas duct at a point located downstream of the heat exchanger, as viewed in the direction of flow of flue gas through the gas duct, and means defining a passageway through which air may be conducted away from the flue gas outlet of the heat exchanger to a point in the flue gas duct located downstream of the branch duct connection.

4,047,560

REGENERATOR FLOW CONTROL

Yih-Wan Tsai, O'Hara Township, Allegheny County, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

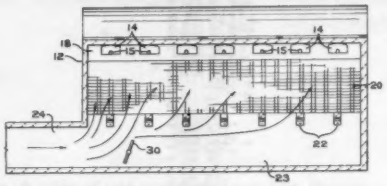
Filed July 8, 1975, Ser. No. 594,153
Int. Cl.[2] F28D *17/00*
U.S. Cl. 165—9.3 **6 Claims**

1. In a regenerative furnace of the type comprising a combustion chamber, a pair of regenerator chambers, a plurality of burner ports spaced along the sides of the combustion chamber providing for the alternate passage of air and exhaust gases

between the combustion chamber and the regenerator chambers, and fuel feeding means associated with each burner port, and in which each regenerator chamber includes a gas-pervious bed of refractory material, a plenum communicating with one side of said bed along its length and with said burner ports, an air distributing space communicating with the opposite side of said bed along its length, and a flue communicating with said air distributing space at one end thereof, the improvement comprising:

a movably mounted baffle in the air distributing space of each regenerator chamber within the first one-third of the air distributing space from the flue end adapted to deflect air passing from said flue into an adjacent portion of said refractory bed; and

means for selectively moving each of said baffles into and out of an air flow diverting position.



5. In a regenerative furnace of the type comprising a combustion chamber, a pair of regenerator chambers, a plurality of burner ports spaced along the sides of the combustion chamber providing for the alternate passage of air and exhaust gases between the combustion chamber and the regenerator chambers, and fuel feeding means associated with each burner port, and in which each regenerator chamber includes a gas-pervious bed of refractory material, a plenum communicating with one side of said bed along its length and with said burner ports, an air distributing space communicating with the opposite side of said bed along its length, and a flue communicating with said air distributing space at one end thereof, the improvement comprising:

a baffle in each plenum extending across substantially the full cross-sectional area of the plenum so as to block the flow of exhaust gases parallel to the top of said refractory bed.

4,047,561

COOLING LIQUID DE-GASSING SYSTEM

Heinz Jaster, and Fred W. Staub, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 515,838, Oct. 18, 1974, Pat. No. 3,989,102. This application Apr. 5, 1976, Ser. No. 673,463

Int. Cl.[2] H01L *23/34*

U.S. Cl. 165—32 **2 Claims**

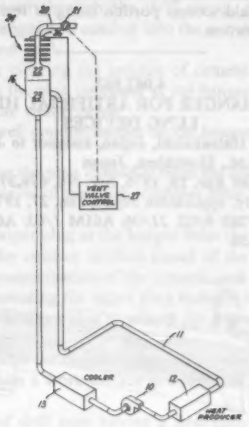
1. A forced liquid cooling system comprising

a main cooling duct loop for continuously circulating dielectric cooling liquid in a closed path past heat producing equipment to be cooled and including a pump for pumping said cooling liquid and a heat exchanger for cooling said cooling liquid,

combined continuous gas separator and liquid-gas interface pressurizer means for pressurizing at least a portion of said cooling liquid with dielectric gas and establishing selected physical conditions to obtain preferential evolution of dissolved gas from said cooling liquid, to thereby prevent the formation of bubbles,

said combined separator and pressurizer means elevated a considerable height above said main cooling duct loop to establish favorable low pressure conditions for gas evolution, and

said combined separator and pressurizer means comprising a pressurizer expansion tank for said cooling liquid having a vertical exit duct connecting to a gas storage tank, a vertically oriented condenser mounted to cool the vapor and



gas in said exit duct, and means for venting excess pressure in said gas storage tank.

4,047,562

HEAT EXCHANGER UTILIZING A VAPORIZED HEAT-CONTAINING MEDIUM

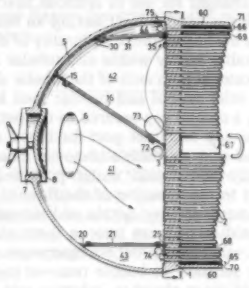
Max Weber, Wiesendangen, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 10, 1975, Ser. No. 594,618

Claims priority, application Switzerland, May 16, 1975, 6380/75

Int. Cl.[2] F28B *1/02*

U.S. Cl. 165—111 **9 Claims**



1. A heat exchanger comprising

a horizontally disposed housing having a hood at one end;

a tube plate mounted in said housing in spaced relation to said hood to separate said housing into two sections;

at least a pair of partitions connected between said hood and said tube plate to define at least three chambers within said hood;

an inlet in said hood in communication with a middle one of said chambers to deliver a heat-containing medium thereto;

an outlet in said hood in communication with a second of said chambers to exhaust the medium therefrom in at least condensed form; and

a plurality of horizontally disposed U-shaped tubes mounted on said tube plate and extending away from said chambers, said tubes being disposed in at least one plane, a first

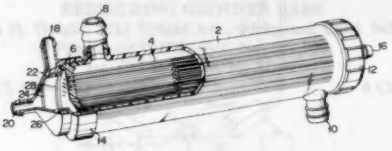
portion of said tubes communicating said one chamber with a third of said chambers, and a second portion of said tubes communicating said third chamber with said second chamber, said second portion being of less number than said first portion.

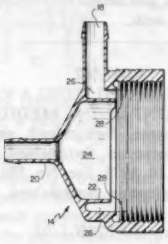
4,047,563

HEAT EXCHANGER FOR ARTIFICIAL HEART AND LUNG DEVICES

Motoji Kurata, Hatsukaichi, Japan, assignor to Japan Medical Supply Co., Ltd., Horishima, Japan

Filed Apr. 19, 1976, Ser. No. 678,373
Claims priority, application Japan, Jan. 27, 1976, 51-7192[U]
Int. Cl.[2] F28F *9/02, 21/06;* A61M *1/03;* A61F *7/00*
U.S. Cl. 165—158 **4 Claims**





1. A heat exchanger for use in artificial heart and lung devices, comprising a tubular shell having an inlet side and an outlet side for a heating medium; a plurality of elongated tubes arranged in parallel axially within said tubular shell; a pair of fixing plates locates at both ends of the tubular shell; a first cap secured to the inlet side of said tubular shell having an inlet port for blood; a second cap secured to the outlet side of said tubular shell having an outlet port for blood and air bubble remover means, said air bubble remover means being positioned vertically above said outlet port and downstream thereof relative to the direction of the flow of blood; and an annular baffle means secured within said second cap to divide the inside of said second cap into an inner chamber and an outer chamber, said blood outlet port communicating with said outer chamber and said air bubble remover means communicating with said inner chamber, wherein said annular baffle means accumulates the blood once in the inner chamber so as to remove air bubbles therefrom through the air bubble remover means and then allows the blood to flow into the outer chamber and subsequently to flow out through the outlet port.

4,047,564

WEIGHT AND PRESSURE OPERATED WELL TESTING APPARATUS AND ITS METHOD OF OPERATION

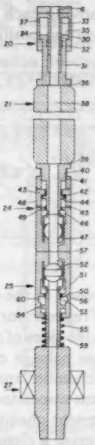
George J. Nix, London, England; Burchus Q. Barrington; David L. Farley, both of Duncan, Okla., and Norman G. Hortman, Laurel, Miss., assignors to Halliburton Company, Duncan, Okla.

Filed July 14, 1975, Ser. No. 595,648
Int. Cl.[2] E21B *33/03, 43/12, 45/00*
U.S. Cl. 166—72 **32 Claims**

1. An apparatus, for use in conjunction with a testing string having a central flow passage therethrough and located in a fluid filled bore of an oil well extending from the earth's surface to an underground formation, comprising:

normally closed valve means, in the lower portion of the testing string and controlling fluid communication through the central flow passage of the testing string, for selectively opening the central flow passage after the testing string has been lowered into the well bore to the underground formation;

normally open valve means, in the testing string adjacent said normally closed valve means and having a valve for controlling fluid communication through the central flow passage of the testing string subsequent to the opening of said normally closed valve means;



means in said testing string for selectively applying weight to said normally open valve means after said testing string is positioned in the oil well bore;

pressure responsive means in said normally open valve means for developing a force responsive to fluid pressure in the well bore, said force being in opposition to the weight imposed by said weight applying means; and,

valve operating means operable for closing said valve in said normally open valve means responsive to the weight imposed by said weight applying means, and for opening said valve responsive to the force developed by said pressure responsive means.

4,047,565

WELL TOOL

Charles D. Crickmer, Houston, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Mar. 29, 1976, Ser. No. 671,209
Int. Cl.[2] E21B *23/00*
U.S. Cl. 166—217 **15 Claims**

1. A well tool for suspending well equipment in a well, the well tool comprising:

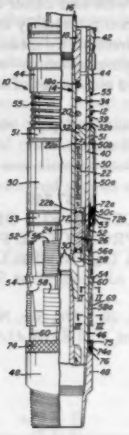
an elongated hanger mandrel;

a plurality of cones axially spaced on said mandrel;

a plurality of sets of slips axially spaced around said mandrel, each set of slips including a plurality of slips circumferentially spaced around said mandrel and positioned with respect to a different one of said cones to engage said one cone upon relative axial movement between the set of slips and the cone;

a plurality of elongated slip reins circumferentially spaced around said mandrel for controlling alignment of said slips

during relative axial movement between the set of slips and the cones, each slip rein being secured to a of slip from



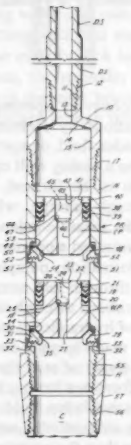
a plurality of said sets of slips and each slip rein controlling the alignment of each slip to which it is secured.

4,047,566

WELL CEMENTING METHOD AND APPARATUS

John A. Duke, 418 Pamela St., Baytown, Tex. 77520

Filed Feb. 27, 1976, Ser. No. 662,047
Int. Cl.[2] E21B *33/16*
U.S. Cl. 166—285 **10 Claims**



1. A method of cementing a well conduit in a well having a wellhead, comprising the steps of:

forming a well conduit to be cemented in a well at a work surface disposed above the wellhead;

mounting a hanger with the well conduit for supporting the well conduit in the well;

mounting a cementing plug container with the well conduit hanger;

connecting drill pipe with the cementing plug container to form a tubular string to support the hanger and well conduit from the work surface;

lowering the cementing plug container, hanger and well conduit by adding drill pipe to position the cementing plug container and hanger adjacent the hanger support in the well with the well conduit extending into the well;

flowing cement through the drill string, plug container, conduit hanger and conduit into the annulus between the conduit and well;

substantially clearing the conduit of cement by releasing a plug from the plug container at the hanger for movement through the well conduit;

resting the well conduit hanger on the hanger support in the well;

disconnecting the plug container from the conduit hanger to allow retrieval of the plug container after the cement has set;

releasing a wiper plug at the hanger from the plug container to clear the conduit of fluid ahead of the wiper plug to prevent contamination of the cement; and

the step of releasing the wiper plug includes blocking a flow passage in a wiper plug to release the wiper plug ahead of said cement.

7. An apparatus for cementing a well conduit supported by a drill string from a work surface in a well having a wellhead, comprising:

a plurality of drill pipe having a first inner diameter suspended from the work surface and extending to a wellhead;

a cementing plug container connected to the lower end of the drill string and positioned at the wellhead;

cement plug means having a second inner diameter with means releasably mounting the plug means with the plug container;

a well conduit hanger for setting with the well connected with the plug container and positioned at the wellhead;

a well conduit having the second inner diameter connected with the conduit hanger and positioned in the well for cementing with the well;

the plug means includes a plug having a flow passage extending through the plug for clearing cement from the conduit; and

the means for releasably mounting includes a plurality of spring biased fingers for retaining the plug means in the plug container.

4,047,567

OIL WELL CEMENTING PROCESS

Jerry D. Childs, and Roosevelt Love, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Feb. 2, 1976, Ser. No. 654,497
Int. Cl.[2] C04B *7/02, 7/35;* E21B *33/14*
U.S. Cl. 166—293 **3 Claims**

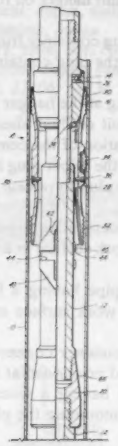
1. A process for sealing at an elevated temperature a zone penetrated by a wellbore using a high efficiency non-gelling hydraulic cement retarder composition having a high degree of predictability for controlling rheology and setting time comprising mixing an aqueous slurry of hydraulic cement with up to about 2% on a dry cement weight basis of a retarder consisting essentially of a low molecular weight sulfoalkylated lignin; wherein the concentration of retarder is calculated to control the setting time of said hydraulic cement to exceed the pumping time; wherein the sulfoalkylated lignin has a molecular weight in the range of about 2,000–10,000 and which is substantially sulfoalkylated on the benzene ring of the lignin molecule in the position ortho to the free phenolic hydroxy group and the sulfonate group is attached to the ortho position by an alkylidene radical having one to three carbon atoms; pumping said hydraulic cement mixture into said zone and maintaining said hydraulic cement mixture in said zone until a high compressive strength is attained.

4,047,568

METHOD AND APPARATUS FOR CUTTING AND RETRIEVING CASING FROM A WELL BORE

Merle W. Aulenbacher, Conroe, Tex., assignor to International Enterprises, Inc., Houston, Tex.

Filed Apr. 26, 1976, Ser. No. 680,472
Int. Cl.[2] E21B *23/00, 29/00, 31/02*
U.S. Cl. 166—298 20 Claims



1. A spearing tool for telescopic disposition with a tubular well pipe or the like comprising:

a gripping assembly comprising first gripping means selectively engageable with said pipe and disengageable therefrom respectively for preventing and allowing movement of said gripping assembly with respect to said pipe in a first longitudinal direction to support said tool in said pipe, and second gripping means longitudinally spaced from said first gripping means and selectively engageable with said pipe and disengageable therefrom respectively for preventing and allowing movement of said gripping assembly with respect to said pipe in a second longitudinal direction opposite to said first direction to spear and retrieve a portion of said pipe;

an operating assembly connected to said gripping assembly and including mandrel means, first actuating means longitudinally fixed with respect to said mandrel means for selectively engaging said first gripping means with said pipe upon relative movement of said assemblies in one direction and second actuating means longitudinally fixed with respect to said mandrel means and longitudinally spaced from said first actuating means for selectively engaging said second gripping means with said pipe upon relative movement of said assemblies in another direction opposite said one direction; and

movement limiting means cooperative between said assemblies to limit said relative movement of said assemblies, and selectively releasable to permit said relative movement of said assemblies.

16. A method of cutting and retrieving pipe and the like in a well bore with a well tool comprising an operating assembly supported on a well string, a gripping assembly connected to said operating assembly and operable thereby to engage and disengage said pipe, releasable movement limiting means cooperative between said assemblies to selectively limit and permit relative movement of said assemblies, and a cutter assembly carried by said well string, said method comprising the steps of:

a. lowering said tool into the well bore on said well string in telescopic relation with said pipe;

b. releasing said movement limiting means;

c. moving said operating assembly in one direction by means of said well string to engage said gripping assembly with said pipe thereby preventing downward movement of said tool with respect to said pipe;

d. cutting said pipe with said cutter assembly;

e. moving said operating assembly in another direction opposite said first direction by means of said well string to engage said gripping assembly with said pipe thereby preventing upward movement of said tool with respect to said pipe;

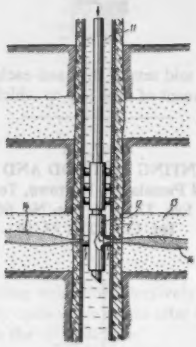
f. raising said tool and said pipe out of said well bore by means of said well string.

4,047,569

METHOD OF SUCCESSIVELY OPENING-OUT AND TREATING PRODUCTIVE FORMATIONS

Kurban Magomedovich Tagirov, ulitsa Lenina, 408a, kv. 25, and Nikolai Rubenovich Akopian, ulitsa Sochinskaya, 64, both of Stavropol, U.S.S.R.

Filed Feb. 20, 1976, Ser. No. 659,745
Int. Cl.[2] E21B *43/26*
U.S. Cl. 166—308 1 Claim



1. A method of successively opening-out and treating gas and oil bearing formations by forming hydraulic fractures therein with abrasive-laden fluid, comprising the steps of pressing jet nozzles tightly to a casing wall opposite the area where a hydraulic fracture is to be formed, the nozzles having a diameter of their through passage, which ensures that at a constant flow rate of the abrasive-laden fluid pumped through the nozzles there is maintained a pressure sufficient for hydraulic fracturing of the formation; pumping said abrasive-laden fluid at said flow rate through said nozzles at a pressure sufficient for making perforations through said casing wall, but not less than the pressure of hydraulic fracturing of the formation, until perforations are made in said casing wall of diameters substantially equal to those of said through passages of said nozzles; upon said perforations having been made, varying the flow rate of said abrasive-laden fluid pumped through said nozzles, to build up a substantially constant pressure within said formation, not less than the pressure of hydraulic fracturing of said productive formation.

4,047,570

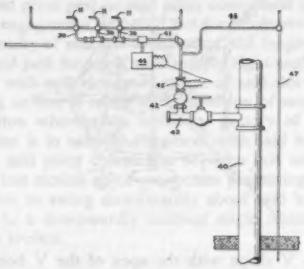
SPRINKLER SYSTEM FOR EXISTING BUILDINGS

Michael E. Munk, 28 Dorchester Drive, Port Chester, N.Y. 10573

Filed Mar. 8, 1976, Ser. No. 664,587
Int. Cl.[2] A62C *35/00*
U.S. Cl. 169—16 7 Claims

1. In a sprinkler system for a building having at least one room and at least one hung ceiling for said one room, at least one duct for heating, ventilating or cooling mounted in the cavity above said at least one ceiling, at least one element

mounted to the wall of said one hung ceiling which is in fluid communication with the interior of said one duct and the interior of said one room, wherein the improvement comprises: at least one main branch tube mounted within said one duct so that said one duct completely surrounds said one main branch tube; means for mounting said one main branch tube in said one duct; at least one secondary branch tube having a first end in fluid communication with the interior of said one main branch tube and a second end mounted in said one element in communication with the interior of said one duct; means for connecting said first end to said one main branch tube; one sprinkler head mounted in said one element and connected to and in fluid communication with said second end of said one secondary branch tube; means for supplying water to said one main branch tube and said one secondary branch tube; means for automatically controlling the operation of said one sprinkler head in response to a fire being detected in said one room; and one tertiary branch tube having a first end connected to and in fluid communication with said one main branch tube and a second end connected to and in fluid communication with said one means for supplying water and said one main branch tube; and means for connecting said first end of said one tertiary branch tube to said one main branch tube, whereby upon the start of a fire in a room, the sprinkler head is supplied with water under pressure via the main branch tube, the secondary branch tube and the tertiary branch tube.



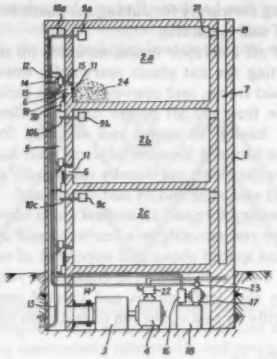
4,047,571

AUTOMATIC FIRE EXTINGUISHING SYSTEM FOR A BUILDING HAVING CENTRAL AIR CONDITIONING

Guy Chaintrier, Les Drouillards, Generac (Gironde), XVeme, and Christian Chaintrier, 8 Rue Frederic Magisson, Paris, XVeme, both of France

Filed Apr. 14, 1975, Ser. No. 568,060
Claims priority, application France, Apr. 12, 1974, 74.13075
Int. Cl.[2] A62C *5/02, 37/00*
U.S. Cl. 169—60 **9 Claims**

1. In a fire extinguishing system for multicompartmented buildings said system comprising: the combination of a trunk-line duct system having an upstream inlet and a plurality of downstream branch duct outlets, at least one of said duct outlets being in each compartment to be protected, an air conditioning system having an outlet connected to said duct system inlet for providing an air stream in said duct system, a high expansion foam plug generator located adjacent at least one branch duct outlet for each compartment to be protected and control means associated with each of said compartments to be protected for simultaneously energizing said air conditioning system and said foam plug generator in response to the presence of a fire in said compartment.

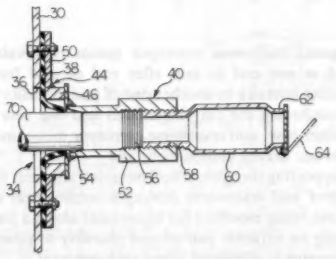


4,047,572

VEHICLE FIRE SUPPRESSION ACCESS PORT

William Richard Stary, Peoria, and David Merrill Shaw, Pekin, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 17, 1976, Ser. No. 687,122
Int. Cl.[2] A62C *35/12*
U.S. Cl. 169—62 **10 Claims**



1. In a fire control apparatus for use in extinguishing fires in a closed compartment, a panel defining one wall of said closed compartment, an access port communicating through said panel into said compartment, said access port comprising a distortable and slotted diaphram covering an opening in said panel, a nozzle assembly aligned with the opening and carried by the panel interior of said compartment whereby fire suppressant directed through the access port and through the nozzle assembly will act to suppress a fire in the compartment.

4,047,573

APPARATUS FOR FACILITATING THE MECHANICAL HARVESTING OF TOMATOES

Kenneth M. Aoyama, 803 Mace Blvd., Davis, Calif. 95616

Division of Ser. No. 604,422, Aug. 13, 1975, Pat. No. 3,990,217.
This application Apr. 29, 1976, Ser. No. 681,715
Int. Cl.[2] A01D *46/00*
U.S. Cl. 171—14 **3 Claims**

1. Apparatus for facilitating the harvesting of tomatoes comprising:

a. a fore and aft frame;

b. means for supporting said frame on the ground as said apparatus is advanced along one row of a plurality of substantially parallel rows of tomato plants, said frame

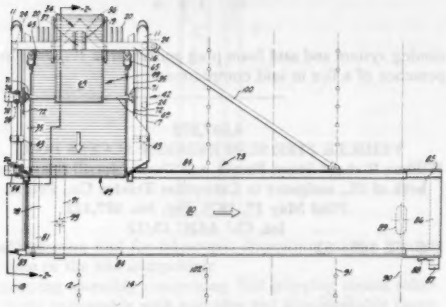
supporting means being a pair of skids straddling the plants in said one row;

c. knife means mounted on the forward end of said frame and projecting forwardly for cutting the plants in said one row ahead of said apparatus;

d. fore and aft conveyor means mounted on said frame for transporting the cut plants rearwardly toward the after end of said frame, said conveyor means including,

1. a main fore and aft power driven endless chain conveyor having an upper run mounted for movement from a forward location adjacent said knife means to receive the plants cut thereby rearwardly and upwardly toward said after end of said frame, and

2. a secondary fore and aft endless chain conveyor having a lower run movable in a rearward and upward direction and spaced above said upper run of said main conveyor a distance such as to engage the subjacent plants cut by said knife means and carried rearwardly and upwardly by said upper run of said main conveyor; and,



e. elongated transverse conveyor means removably connected at one end to said after end of said frame and extending laterally to another one of said plurality of rows for transferring the cut plants from said one row toward said other row, said transverse conveyor means including,

1. a power driven endless belt, and

2. a supporting dirigible wheel mounted adjacent the other end of said transverse conveyor means, said dirigible wheel being mounted for movement along a path separating an adjacent pair of said plurality of rows as said apparatus is advanced along said one row,

said transverse conveyor means being of a predetermined length such that as the cut plants from said one row are discharged at said other end of said transverse conveyor means the cut plants from said one row are united with the plants in said other row and in which the united plants in said other row are capable of being harvested by a mechanical harvester.

4,047,574

IMPLEMENT FOR LEVELLING LEVEES

Calvin I. Foreman, Rte. 1, Box 8, Iowa, La. 70647

Filed June 1, 1976, Ser. No. 691,248

Int. Cl.[2] A02B *13/02, 35/02;* **F02F** *5/08*

U.S. Cl. 172—178 **2 Claims**

1. An implement for levelling levees and the like to the general contour of the earth's terrain comprising:

a. frame means;

b. said frame means including:

1. longitudinally extending, spaced members;

2. spaced lateral members extending between and connected to said longitudinally extending members to form a frame having spaced sides, a front and rear end;

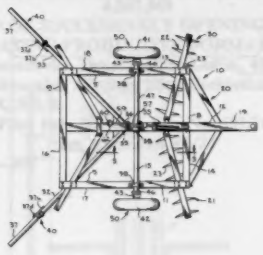
3. tow bar means projecting from said front end of said frame; and

c. a pair of ganged disc harrows supported by said frame means and depending downwardly therefrom;

d. each of said pair of ganged disc harrows extending inwardly from a side of said frame and towards the rear end of the frame to form a generally V shape with the apex of the V shape being disposed adjacent the center longitudinal axis of said frame;

e. dozer blade means supported by said frame means and depending therefrom;

f. said dozer blade means comprising a pair of dozer blades each of which extends from a side of said frame and inwardly towards the front end of the frame to form gener-



ally a V shape with the apex of the V being disposed adjacent but rearwardly of the apex of the V formed by said ganged disc harrows;

g. adjustable wheels means supporting said frame;

h. means to adjust said wheel means to raise and lower said frame relative to the terrain to thereby regulate the contact of said ganged disc harrows and dozer blade means with the earth; and

i. said dozer blades each including an end portion which is pivotally mounted thereon whereby such end portion may be moved up on top of the balance of said dozer blade to reduce the width of the dozer blade.

4,047,575

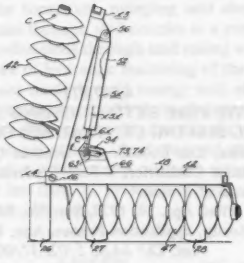
FOLDUP IMPLEMENT WITH LIFT ARRANGEMENT FOR WING THEREOF

Robert L. Wagner, La Porte, Ind., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Jan. 8, 1976, Ser. No. 647,608

Int. Cl.[2] A01B *73/00, 63/22*

U.S. Cl. 172—311 **13 Claims**



1. A farm implement including a main section adapted for connection in draft relation to a tractor and a wing section pivotally connected to the main section at one lateral side of the latter for vertical swinging movement about a longitudinal axis between a lowered working position and a raised transport position, means for pivoting said wing section relative to said main section between said working and transport positions comprising:

a double-acting hydraulic jack disposed in transverse rela-

tion to said longitudinal axis having cylinder and rod components,

pivot means pivotally connecting one of said components to one of said sections at a point spaced from said longitudinal pivot axis, and

a lost motion pivot connection between the other of said components and the other of said sections including

a first pivot part fixedly secured to said other section at a position spaced laterally from said longitudinal pivot axis including an elongated slot with the elongated extent thereof extending generally laterally relative to said other section, said pivot part and said pivot means being disposed on laterally opposite sides of said longitudinal pivot axis when said wing section is in its lowered working position, and

a second pivot part on said other component in cooperative engagement with said slot for movement from one extremity of said slot to the other, the longitudinal axis of said jack having a substantially right-angle relationship with said elongated extent of said slot when said wing section is raised by contraction of said jack to a position wherein the center of gravity of said wing section is in vertical alignment with said longitudinal axis, said pivot connection between said sections and said lost motion pivot connection permitting said wing section to swing downwardly about said longitudinal axis to a downwardly inclined angle relative to said main section.

4,047,576

CULTIVATOR WHEEL FOR AGRICULTURAL MACHINES

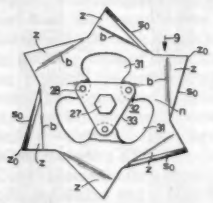
Willy Rau, Weilheim, Teck, and Christian Taus, Kirchheim, Teck, both of Germany, assignors to Maschinenfabrik Rau OHG, Weilheim, Teck, Germany

Filed Aug. 15, 1975, Ser. No. 605,186

Claims priority, application Germany, Aug. 17, 1974, 2439595; July 26, 1975, 2533625

Int. Cl.[2] A01B *15/16*

U.S. Cl. 172—540 **12 Claims**



1. A cultivator wheel having an axis and adapted for rotation about said axis, comprising a hub; a plurality of successive triangular tines having pointed end portions and being distributed about said hub, successive ones of said tines being bent in opposite directions out of a central radial plane of said wheel, said tines having shorter sides and longer sides, said shorter sides of said tines extending nonradially relatve to said axis, said longer sides of said tines being provided with cutting edges each extending substantially along the full length of the respective one of said longer sides and inclined to said central radial plane; said wheel being provided with openings between said cutting edges and said hub.

4,047,577

DISCHARGE CONTROLLING PLOW SWEEP

Robert C. Tibbs, II, Hospital Drive, Cleveland, Miss. 38732

Filed Sept. 22, 1976, Ser. No. 725,422

Int. Cl.[2] A01B *39/20*

U.S. Cl. 172—730 **8 Claims**

1. A plow sweep including a shovel body defining a central front to rear extending axis and having a pair of first and second rearwardly divergent blade arms disposed on opposite sides of said axis joined at their forward ends along said axis to define a forward apex of said sweep, said arms being transversely rearwardly and upwardly inclined and the rear portion of said apex including an integral upwardly directed mounting shank portion, the rear end of at least one of said arms terminating in an oppositely forwardly angulated blade-type wing arm, the forward edges of said arms being sharpened and said wing arm also being transversely rearwardly and upwardly inclined, the portions of said wing arm and the corresponding blade arm adjacent the juncture thereof having their rear edge portions downwardly depressed into at least generally horizontal front to rear extending positions.

4,047,578

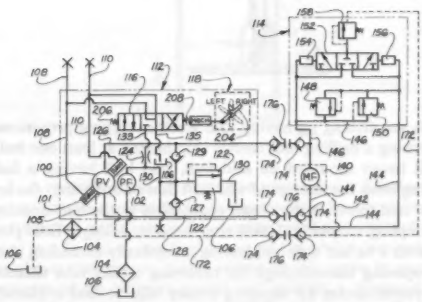
PORTABLE EARTH BORING MACHINE

William S. Appleman, Ashland, Ohio, assignor to The Richmond Manufacturing Company, Ashland, Ohio

Continuation-in-part of Ser. No. 455,388, March 27, 1974, Pat. No. 3,907,043. This application June 30, 1975, Ser. No. 591,642

Int. Cl.[2] E21D *9/02*; E02D *7/28*

U.S. Cl. 173—152 **2 Claims**



1. An earth boring apparatus for drilling vertically extending holes and pushing casing sections therein, said apparatus comprising, in combination, vertically extending track means; main frame means mounted for movement along said track means; a fluid motor mounted on said main frame means; auger connecting shaft means driven by said fluid motor; auxiliary frame means for disposition at a location remote from said main frame means; an engine mounted on said auxiliary frame means; variable displacement pump means mounted on said auxiliary frame means and driven by said engine; conduit means forming a closed loop circuit between said pump means and said fluid motor; a servo motor for varying the displacement of said pump means; pump control valve means for controlling a control flow of pressurized fluid to said servo motor, said valve means including a "center" position isolating said fluid motor from said control flow, a "right" position for delivering said control flow to one side of said servo motor, and a "left" position for delivering said control flow to the other side of said servo motor; manually operated control means for actuating said pump control valve means, said closed loop circuit including a first circuit portion that is alternately exposed to

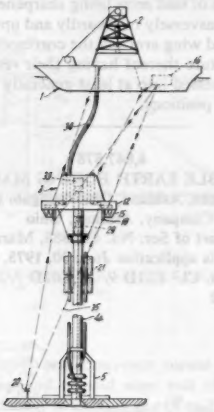
high and low pressure, and a second circuit portion that is alternately exposed to high and low pressure; a second pump means for charging said closed loop circuit with make-up fluid; and check valve means for selectively releasing said make-up fluid to whichever one of the circuit portions is operating at low pressure.

4,047,579

SEA DRILLING JIG

Hellmut Wilckens, Emden, and Helmut Wetzel, Hannover, both of Germany, assignors to Rheinstahl AG, Germany

Filed Mar. 4, 1976, Ser. No. 663,915
Claims priority, application Germany, Sept. 27, 1975, 2543293
Int. Cl.[2] E21B *15/02*
U.S. Cl. 175—7 **8 Claims**



1. A sea drilling jig having foul weather rigging provisions, comprising a drilling tool carrier ship having at least one hull, a drill tower mounted on said hull, said hull having a hull opening from the interior of said hull downwardly into the sea below said tower, a riser head engageable in the hull opening for coupling to said hull, said riser head including a float portion with a ballast tank and having a vertically extending riser tube opening therethrough for receiving a riser tube therein, securement means for securing a riser tube so that it extends through said riser head opening and is secured to said riser head, said riser head being detachable from said carrier ship and self-propulsion means on said riser head for maneuvering said riser head with the riser tube secured thereto independently of the ship.

4,047,580

HIGH-VELOCITY JET DIGGING METHOD

Teruo Yahiro, and Hiroshi Yoshida, both of Tokyo, Japan, assignors to Chemical Grout Company, Ltd. and Kajima Corporation, both of Tokyo, Japan

Continuation of Ser. No. 523,647, Nov. 13, 1974, abandoned.
This application Mar. 12, 1976, Ser. No. 666,280
Claims priority, application Japan, Sept. 30, 1974, 49-111600
Int. Cl.[2] E21B *7/18*
U.S. Cl. 175—67 **4 Claims**

1. A method of digging in the earth comprising the steps of moving a nozzle along a subterranean longitudinal path while directing a high velocity jet of liquid from the nozzle in a direction which is transverse to said path, surrounding the jet of liquid with a gaseous jet directed substantially parallel to the jet of liquid, reducing increases in the cross section of the jet of liquid and increasing and making more uniform its effective

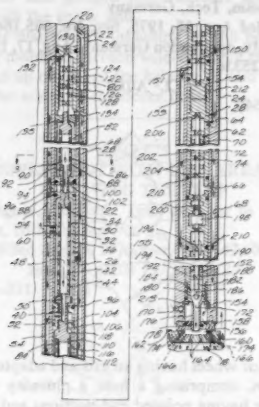
length by maintaining the velocity of the jet of gas at least about one-half the velocity of sound in the gas.

4,047,581

MULTISTAGE, DOWNHOLE, TURBO-POWERED INTENSIFIER FOR DRILLING PETROLEUM WELLS

John W. Erickson, Huntington Beach, Calif., assignor to Kobe, Inc., Huntington Park, Calif.

Filed Dec. 1, 1976, Ser. No. 746,408
Int. Cl.[2] E21B *3/08*
U.S. Cl. 175—95 **19 Claims**



1. A multiple stage, downhole, turbine-powered intensifier for drilling petroleum wells comprising:

a. a plurality of turbines aligned along a common axis;

b. a plurality of rotary pumps driven by the plurality of turbines and axially aligned therewith, the pumps and turbines forming an assembly which is long and comparatively small in maximum dimension taken radially of the axis;

c. passage means to supply the turbines with power fluid in parallel streams with each turbine having one of the parallel streams as its input;

d. passage means to exhaust the turbines of the power fluid;

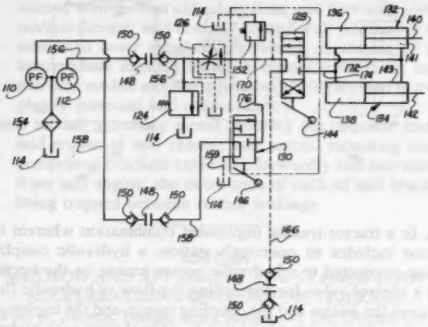
e. passage means to supply the pumps with a working fluid in series so that each pump stage increases the pressure of the working fluid; and

f. nozzle means at the base of the intensifier for receiving the working fluid from the last stage pump and directing such fluid at bore hole wells.

4,047,582
PORTABLE EARTH BORING MACHINE

William S. Appleman, Ashland, Ohio, assignor to The Richmond Manufacturing Company, Ashland, Ohio

Continuation-in-part of Ser. No. 455,254, March 27, 1974, abandoned. This application June 30, 1975, Ser. No. 591,641
Int. Cl.[2] E21D 9/02; E02D 7/28
U.S. Cl. 175—122 2 Claims



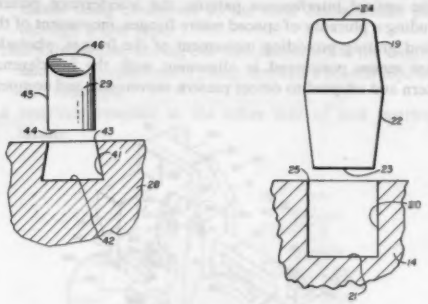
1. An earth boring apparatus for drilling vertically extending holes and pushing casing sections therein, said apparatus comprising, in combination, vertically extending track means; casing pusher means on said track means for engaging the rear end of a casing section; pushing cylinder means for moving said casing pusher means along said track means and including an extension chamber and a retraction chamber; auxiliary frame means for disposition at a location remote from said main frame means; an engine mounted on said auxiliary frame means; pump means driven by said engine for delivering pressurized fluid to said pushing cylinder means; conduit means connecting said pushing cylinder means with said pump means; control means including a directional valve means in the flow of pressurized fluid from said pump means to said pushing cylinder means, said directional valve means including a closed center position for isolating both of said chambers from said flow, an extension position for pressurizing said extension chamber and draining said retraction chamber, and a retract position for pressurizing said retraction chamber and draining said extension chamber; volumetric flow varying controller in said control means and including a low flow position for delivering a relatively low volumetric flow from said pump means to said pushing cylinder means and a high flow position for delivering a relatively high volumetric flow from said pump means to said pushing cylinder means; a first manual actuator for said control means for selectively positioning said directional valve means in said center, extension, and retraction positions; a second manual actuator for said control means for selectively positioning said volumetric flow varying valve means in said low flow and high flow positions; and variable flow control means in the flow of pressurized fluid from said pump means to said directional controller , said pump means including a first pump for delivering a first flow of pressurized fluid to said directional valve means, and a second pump for delivering a second flow of pressurized fluid to said volumetric flow varying controller.

4,047,583
EARTH BORING CUTTING ELEMENT RETENTION SYSTEM

Norman Dean Dyer, Plano, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed June 1, 1976, Ser. No. 691,732
Int. Cl.[2] E21C 13/00
U.S. Cl. 175—410 5 Claims

5. In a rock drill bit having an insert receiving socket for receiving a hardened insert, wherein the socket has an inner wall and bottom and the insert has an outer wall, the improvement comprising:

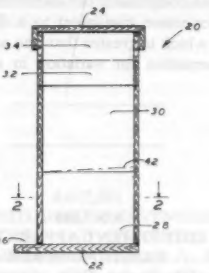


said socket inner wall being tapered outward toward said bottom and
said insert outer wall being cylindrical.

4,047,584
BEE-HIVE SCALE

Richard T. Daly, Coleman Court, Huntington, N.Y. 11743

Filed July 8, 1976, Ser. No. 703,543
Int. Cl.[2] G01G 19/00, 3/14; G01L 5/12
U.S. Cl. 177—1 11 Claims



1. A portable bee-hive scale comprising; a housing and power source, a probe having a tongue extending from one end and adapted to be removably inserted at predetermined locations in a bee-hive, reaction means on the probe responsive to weight on the tongue, gauge means on the probe to read the response of the reaction means and provide a representative electrical signal, logic, memory and display means in the housing electrically connected to the gauge means to receive and process the signal therefrom, and control means to selectively operate the memory, logic and display means to indicate a desired weight.

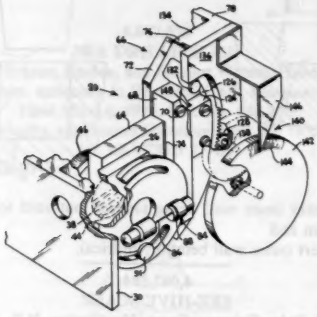
4,047,585
SCALE OPTICAL DETECTOR WITH SPRING CONSTANT VARIATION COMPENSATOR

Daniel F. Dlugos, Huntington, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 8, 1976, Ser. No. 664,579
Int. Cl.[2] G01G 3/00, 23/36
U.S. Cl. 177—210 R 14 Claims

1. A weighing scale comprising a tare structure including load supporting means, spring means having a spring constant and adapted to provide substantially linear vertical displacement of the tare structure as a direct function of the mass of a load being weighed, and an optical detector for determining the extent of tare structure displacement, the detector including a first optical grating, means fixing the first optical grating with respect to tare structure displacement, a second optical grating, means interconnecting the second optical grating to the tare structure for unitary movement therewith the detector

further including means providing a light beam, the gratings being so positioned as to modulate the light beam to have a cyclic optical interference pattern, the interference pattern including a plurality of spaced moire fringes, movement of the second grating providing movement of the fringes, photodetector means positioned in alignment with the interference pattern and adapted to detect pattern movement, and compen-



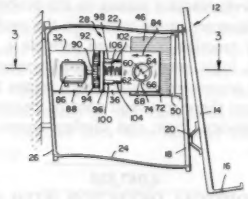
sating means including means to adjustably vary the angle of both said first and said second second gratings with respect to the direction of tare structure displacement, said compensating means adapted to compensate the interference pattern to provide pattern movement equivalent to a displacement of the second grating which is greater than the actual displacement, whereby compensation for variation in spring constants is provided.

4,047,586

ZERO LOAD ADJUSTMENT APPARATUS FOR SPRING WEIGHING SCALE

Daniel F. Dlugos, Huntington, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 23, 1976, Ser. No. 669,528
Int. Cl.² G01G *23/26*
U.S. Cl. 177—210 R **15 Claims**



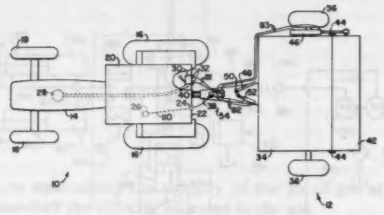
1. A zero load adjustment apparatus for a spring weighing scale having an optical detector and adapted to determine load weight as a function of the detected position of a scale tare, the detector including photodetector means for sensing the image of a modulated light beam, the adjustment apparatus comprising means mounting the photodetector means for movement in a plane transverse to the axis of the light beam and means adapted to provide controlled displacement of the photodetector means with respect to the image of the modulated light beam whereby the photodetector means may be registered with an image configuration at a tare no load position such that the photodetector means will provide a zero load signal to provide compensation for changes in the tare no load position.

4,047,587

TRACTOR-IMPLEMENT CONTROL SYSTEM

Henry Dennis Anstey, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Filed July 12, 1976, Ser. No. 704,287
Int. Cl.² B60K *25/00*; F16K *31/46*
U.S. Cl. 180—53 R **8 Claims**



1. In a tractor-trailing implement combination wherein the tractor includes an operator's station, a hydraulic coupling means connected to a hydraulic power source on the tractor, and a control valve for controlling the flow of hydraulic fluid between the source and the coupling means, and the implement includes a frame and at least two functional units with hydraulic actuators, an improved hydraulic control system for connecting the hydraulic actuators on the implement to the coupling means on the tractor and directing the flow of hydraulic fluid between them comprising:

an implement valve mounted on the implement frame having an inlet connected to the coupling means, at least two outlets respectively connected to the hydraulic actuators, and a control element movable to a plurality of settings so that the inlet may be selectively connected to any one of the outlets and biased to a first setting; and

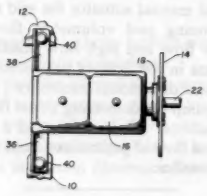
means operatively connected to the control element for moving the control element between its alternate settings and including locking means for retaining the control element in any one of the selected settings and actuating means disposed at the operator's station and connected to the locking means so that an operator on the tractor may selectively direct hydraulic power to any one of the hydraulic actuators on the implement.

4,047,588

SNOWMOBILE ENGINE MOUNT

Jaroslav Blass, Chaska, Minn., assignor to Kawasaki Motors Corporation U.S.A., Santa Ana, Calif.

Filed Dec. 22, 1975, Ser. No. 643,554
Int. Cl.² B60K *5/06*
U.S. Cl. 180—64 R **2 Claims**



1. In a snowmobile having a chassis including a generally vertical side frame, and an engine including an output shaft extending laterally therefrom through said side frame and an output end having a crankcase extension flange extending outwardly therefrom, an improved engine mounting comprising;

first mounting means at the output end of said engine including rigid inner and outer mounting members spaced radi-

ally of said output shaft and a resilient intermedite member trapped between said rigid inner and outer members; said inner mounting member comprising a base portion secured to said extension flange, a first wall portion extending outwardly from said base portion in a direction generally parallel to the axis of said output shaft and a second wall portion extending from the first wall portion normal thereto; said outer mounting member comprising a base portion secured to said side frame, a first wall portion extending from said base portion toward said engine and a second wall portion extending from said first wall portion normal thereto, said first and second wall portions of said inner and outer members restraining movement of said intermediate member in all directions, said inner, outer and intermedite mounting members being formed to completely surround said output shaft;

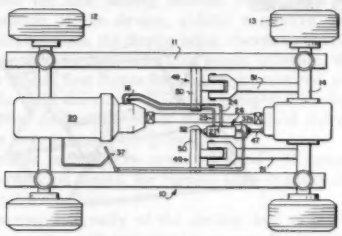
and second mounting means securing the opposite end of said engine to said chassis; said second mounting means comprising brackets extending forwardly and rearwardly from said engine, the outer ends of each of said brackets being trapped between rubber bushings.

4,047,589

METHOD AND APPARATUS FOR CLOSED LOOP ACCELERATION CONTROL FOR VEHICLES

Harvey B. Jansen, Tempe, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Mar. 18, 1976, Ser. No. 668,154
Int. Cl.² B60K *26/00*
U.S. Cl. 180—108 **13 Claims**



1. An acceleration control system for a vehicle having an engine with a throttle, a variable speed transmission, an axle with a housing, and drive wheels comprising:

a. power responsive means for adjusting the transmission to change the speed ratio thereof;

b. means controlling the application of power to said power responsive means;

c. actuating means for said power controlling means responsive to engine throttle movement, transmission output speed, and drive wheel thrust.

4,047,590

HYDRAULIC CIRCUIT FOR STEERING CONTROL IN ARTICULATE VEHICLES

Kenzo Hoashi, Yokohama, and Nobuaki Inaba, Hiratsuka, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 5, 1975, Ser. No. 638,071
Int. Cl.² B62D *5/06*
U.S. Cl. 180—139 **3 Claims**

1. A hydraulic circuit for steering control in articulate vehicles including a prime mover said circuit comprising:

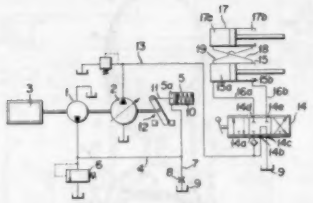
a fixed displacement pump driven by said prime mover, the output of said fixed displacement pump being directly proportional to the speed of said prime mover;

a variable displacement pump driven by said prime mover, the output of said variable displacement pump being connected to a control valve of a steering actuator;

control cylinder means including a piston rod for controlling displacement of said variable displacement pump and a spring acting on said piston rod, said control cylinder means being connected to the fixed displacement pump through a first pipe;

restricting means having one side connected to the output of said fixed displacement pump through a branch pipe from said first pipe;

a reservoir coupled to the other side of said restricting means;



wherein said control cylinder means is actuated by the force of said spring and an opposite force resulting from a differential hydraulic pressure at said restricting means and whereby the output of said variable displacement pump is held constant irrespective of the speed of said prime mover; and

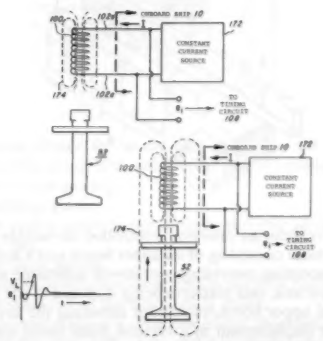
linkage means interconnecting said variable displacement pump and the piston rod of said control cylinder means.

4,047,591

AIR GUN MONITORING AND SYNCHRONIZING METHOD AND APPARATUS

Phillip W. Ward, Dallas; Robert C. Donald, Jr., Richardson, and Arthur E. Leerskov, Jr., Sherman, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 3, 1975, Ser. No. 564,932
Int. Cl.² G01V *1/02, 1/38*
U.S. Cl. 181—119 **19 Claims**



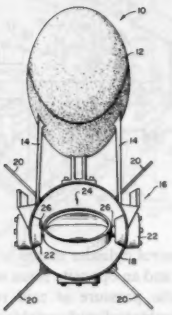
1. In a method for controlling the time of firing of an air gun actuated through subjecting a shuttle to gas pressure to thereby accelerate said shuttle and release compressed gas stored in said gun, the improvement comprising monitoring movement of said shuttle when accelerated by use of a sensor responsive to variation in a field caused by such movement which variation produces a signal indicative of such movement.

4,047,592

SELF-DRIVEN UNDERWATER NOISEMAKING DEVICE

Charles W. Sieber, Sterling, Va.; Richard K. Knutson, Rockville, and John W. Johnston, Suitland, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 20, 1976, Ser. No. 724,808
Int. Cl.[2] G10K *10/00*; B63G *7/08*
U.S. Cl. 181—142 6 Claims



1. A towable, self-driven, underwater noisemaking device, comprising:

an underwater towable body device for connection to a tow cable from a vehicle; and

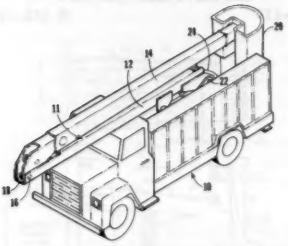
auto-rotational disc cavitation means rotating about an axis within said disc's plane and attached for rotation to said towable body device.

4,047,593

ACTUATING SYSTEM FOR TRANSPORTABLE ARTICULATED BOOMS HAVING RAISABLE PLATFORMS

Bruce Dammeyer, Fort Wayne, Ind., assignor to Teco, Inc., Fort Wayne, Ind.

Filed Aug. 11, 1975, Ser. No. 603,789
Int. Cl.[2] B66F *11/04*
U.S. Cl. 182—2 5 Claims



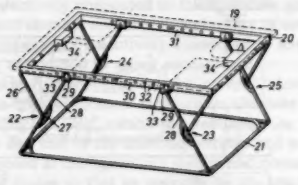
1. In a vehicle, an operator controlled elevatable platform and a lift boom consisting of an upper boom and a lower boom having a mounting providing operatively selectable movement on a vertical axis, said platform being disposed at the projected end of said upper boom, means for elevating the lower boom by arcuate displacement in a vertical plane about the pivoted end thereof, and actuator means disposed between said upper and lower booms at the articulated connection therebetween and comprising a fluid motor actuator, including a cylinder having an intermediate trunnion mounting disposed at the geometric center of one of said booms, and a four bar linkage force-transmitting connection comprising a base link a driver link, a driven link and a follower link, between said fluid motor actuator and said boom and effective at full contraction of said booms relatively to each other wherein said upper boom is in surmounted parallel relation to the lower boom and wherein said fluid motor actuator is fully retracted into its associated boom, the respective bars of said four bar linkage being arranged in which the active forces on each bar of said bar linkages are limited to tension and compression and at least one of said bars is disposed wholly within the associated boom when said fluid motor actuator is fully retracted, said four bar linkage having three pivot connections with said upper and lower booms respectively and so disposed that a line connecting said trunnion mounting and the connection of said fluid motor actuator with said four bar linkage is geometrically offset relatively to the pivoted end of said upper boom and disposed to impart lift force to said upper boom commencing from full retraction of said upper and lower booms.

4,047,594

SCAFFOLD AND PLATFORM ADAPTABLE FOR ASSEMBLY AND DISASSEMBLY

Hans Jochen Eisenberg, Wettiner Str. 47a, 5600 Wuppertal 2, Germany

Filed May 17, 1976, Ser. No. 686,879
Claims priority, application Germany, Feb. 27, 1976, 2608060
Int. Cl.[2] E04G *1/18*
U.S. Cl. 182—153 5 Claims



1. A scaffolding and platform adapted for assembly and disassembly and for adjusting as to height consisting essentially of

a plurality of similar rectangular platform blocks each provided with a lower frame, an upper frame, a rectangular platform carried by the upper frame and four scissors for the four corners of the platform, said scissors being arranged in pairs on the two longitudinal sides of the platform blocks,

each scissor having two legs, one leg of each scissor being articulated with one end at one of the four corner points of the lower frame whereas the other end of said one leg is slidable on one of the two longitudinal sides of the upper frame and arrested by stop means at different points of the longitudinal side of the upper frame for adjusting the height of the platform,

a number of rectangular intermediate slabs having the same plan form as the platform blocks,

said intermediate slabs being attached at the longitudinal sides of the upper frames of neighboring platform blocks,

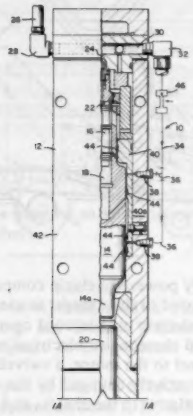
attaching elements for inserting between the longitudinal sides of the slabs and of the upper frame,

said attaching elements being arranged at the middle section of the longitudinal sides of the upper frame of the blocks and limiting the displaceability of the slidable ends of one of said scissor legs, thus guaranteeing a minimum height of the platform blocks when slabs are inserted in the scaffolding.

4,047,595
HYDRAULIC-POWERED DEVICE

Glen O. Baker, Jr., Kent, Wash., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sept. 22, 1975, Ser. No. 615,409
Int. Cl.[2] F01M 9/00
U.S. Cl. 184—6.14 6 Claims



1. An improved, hydraulic-powered device, such as an impact ram and the like, having internal components which, during operation of the device, exhibit a relative, slidable interface therebetween, the device being operative in response to power supplied by hydraulic fluid under pressure, the device further having first means for admitting pressured, powering hydraulic fluid thereinto to operate same, and having second means for discharging spent hydraulic fluid therefrom, wherein the improvement comprises:

conduit means, in fluid-flow communication with one of said first and second means, for tapping off a quantity of supplied hydraulic fluid; and

means opening internally of the device, and in fluid-flow communication with said conduit means, for introducing tapped-off hydraulic fluid internally of the device for lubricating the slidably-interfacing components.

4,047,596
ELEVATOR SYSTEM

Charles L. Winkler, Worthington, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 5, 1975, Ser. No. 574,767
Int. Cl.[2] B66B 1/20
U.S. Cl. 187—29 R 9 Claims

1. An elevator system for a structure having a plurality of floors, comprising:

a plurality of elevator cars having doors operable between open and closed positions,

means mounting said plurality of elevator cars for movement relative to the floors,

means for registering requests for elevator service for at least certain of the floors,

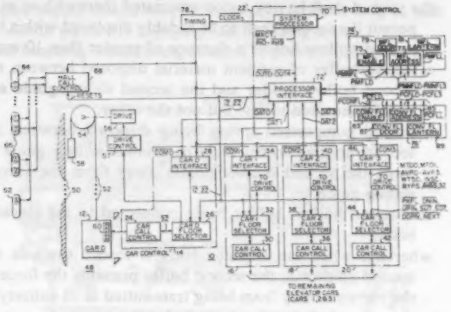
car control means for each of said elevator cars, said car control means providing an inactivity signal when its associated elevator car is idle,

control means providing signals for said car control means which cause said plurality of elevator cars to answer requests for elevator service according to a predetermined strategy,

said control means including a first strategy for providing predetermined special service for a first special floor, and second strategy for providing predetermined special service for a second special floor, with said first and second strategies each including the parking of an idle elevator car at the special floor,

first and second enable means for selectively activating the first and second strategies, respectively,

first and second position selector means for selecting first and second floors to which the first and second strategies are to be applied, respectively,



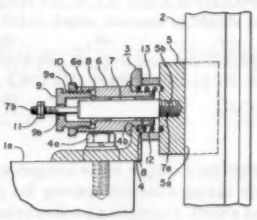
first and second door mode selector means for selecting the door positions of elevator cars parked at the first and second special floors, respectively,

and first and second service direction selector means for selecting the service directions of elevator cars parked at the first and second special floors, respectively.

4,047,597
GUIDE DEVICE FOR ELEVATOR

Masaatsu Okura; Kazutoshi Ota, and Sadayuki Otomi, all of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 14, 1976, Ser. No. 649,204
Claims priority, application Japan, Jan. 14, 1975, 50-6805
Int. Cl.[2] B66B 7/04
U.S. Cl. 187—95 1 Claim



1. A guide device for an elevator body, the elevator body being movable along first and second parallel guide rails, the guide device comprising:

a first sliding guide,

the first sliding guide being slidably movable along the first guide rail,

a first hollow holder,

a first shaft slidably disposed within the first hollow holder and connected to the first sliding guide,

the first shaft having a stop associated therewith so as to permit the first shaft to be slidably displaced within the first hollow holder a distance of greater than 10 mm.,

a first buffer of resilient material disposed between the first hollow holder and the first sliding guide and being connected to one but not the other,

a first compressed spring being disposed between the first hollow holder and the first sliding guide to force the first hollow holder away from the first sliding guide,

the first hollow holder being connected to the elevator body,

a second sliding guide,

the second sliding guide being slidably movable along the second guide rail,

a second hollow holder,

a second shaft slidably disposed within the second hollow holder and connected to the second sliding guide,

the second shaft having a stop associated therewith so as to permit the second shaft to be slidably displaced within the second hollow holder a distance of greater than 10 mm.,

a second buffer of resilient material disposed between the second hollow holder and the second sliding guide and being connected to one but not the other,

a second compressed spring being disposed between the second hollow holder and the second sliding guide to force the second hollow holder away from the second sliding guide,

the second hollow holder being connected to the elevator body,

whereby, when the elevator body is forced towards the second guide rail, the second buffer prevents the force of the elevator body from being transmitted in its entirety to the second sliding guide in order to permit the second sliding guide to remain in alignment with the second guide rail and whereby, when the elevator body is forced towards the second guide rail, the slidable first shaft permits the first hollow holder to be displaced away from the first slide guide by an additional distance greater than 10 mm. in order to permit the first sliding guide to remain in alignment with the first guide rail.

4,047,598

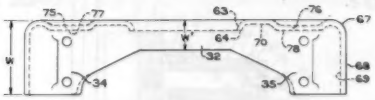
CALIPER BRAKE TORQUE PLATE

Arthur J. Thrower, Troy, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Sept. 13, 1976, Ser. No. 722,982

Int. Cl.[2] F16D *65/00*

U.S. Cl. 188—71.1 **6 Claims**



1. A torque plate for a caliper brake comprising a generally disc-shaped body having a central opening for positioning of said plate around a shaft, a mounting portion extending continuously around said opening having a first surface, a peripheral flange at an outer edge of said body having a peripheral flange surface, said flange extending along at least a portion of said outer edge and being positioned with said flange surface generally perpendicular to said first surface, said flange surface including a pair of spaced-apart rail supporting surfaces on said flange spaced from said mounting portion for mounting supporting brake members on which the caliper and friction lining carriers of said brake are slidably supported, said peripheral flange being positioned at the edge of said mounting portion at a position between said rail supporting surfacesand being continuous therebetween along said edge with said peripheral flange having a substantial width in a direction perpendicular to said first surface at said rail supporting surfaces to provide a long register for the brake supporting rails and a reduced width at said position between said rail supporting surfaces, and second surfaces raised from said first surfaces of said body at positions outward of said mounting portion in the proximity of said rail supporting surfaces.

4,047,599

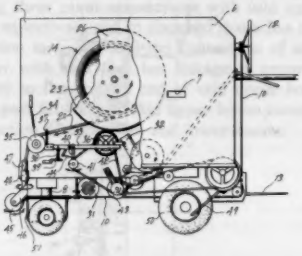
ELECTRICALLY POWERED VEHICLE AND FEED CART

Victor Rousseau, 700 R.R. No. 1, St. Monique Parish, Nicolet County, Canada (J0G 1N0)

Filed May 11, 1976, Ser. No. 685,352

Int. Cl.[2] H02G *11/02*

U.S. Cl. 191—12.2 A **6 Claims**



1. An electrically powered vehicle comprising a chassis, an electric motor secured to the chassis, an electric plug-in cord, a reel having the electric plug-in cord operatively connected thereto and wound thereon, an electrical connection electrically joining the reel to the motor, a swivelling pulley carried by the chassis, operatively engaged by the cord, and laterally guiding the latter relative to the chassis, and a reel drive assembly rotatively biasing said reel toward operative winding of the cord thereon, said reel drive assembly including a lever pivoted to the chassis about an axis parallel to the rotation axis of the reel for movement toward and away from said reel, a friction drive wheel rotatably mounted on said lever for rotation about an axis parallel to the rotation axis of the reel, said lever being spring biased to bring said friction drive wheel in driving engagement with the periphery of said reel to rotate the latter in winding direction with respect to the electric cord, and said friction drive wheel displaceable with the support away from said driving engagement with the reel, and an idler pulley rotatively carried by said lever and operatively engaged and biased by the electric cord toward displacement of the lever away from said reel and of the rotary friction wheel away from driving engagement with the reel under predetermined tension in the electric cord.

4,047,600

CONTINUOUS JUNCTION BETWEEN ALUMINUM CONDUCTOR RAILS

Alexander Maitland, Schaffhausen, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed July 30, 1975, Ser. No. 600,393

Claims priority, application Switzerland, Aug. 28, 1974, 11756/74

Int. Cl.[2] B60M *1/30*

U.S. Cl. 191—29 R **1 Claim**

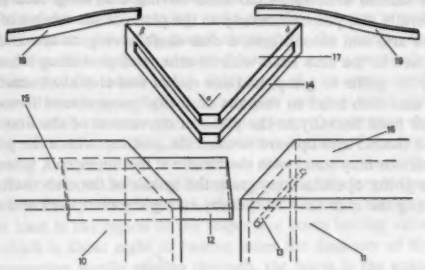
1. A conductor rail junction for use in connection with a power collector shoes, comprising, in combination:

at least two aluminum or aluminum alloy rails disposed end to end and each having an abrasive resistant electrical power transfer layer adapted for contact by said power collector shoe;

each of the ends of said rails facing each other having a surface having an angle of from about 60° to about 120° with respect to the length of said rails and defining a gap;

an insert composed of a metal selected from the group consisting of steel, iron, copper, aluminum, nickel, bronze, brass, and alloys of these metals or combinations of these metals and having a shape complementary to said gap and engaging said gap, said insert having a shape in its plan view of at least a trucated isosceles triangle, whereby a substantially continuous surface is obtained even if the size of said gap undergoes any change;

supporting means operable for engaging the ends of said rails and for supporting said insert; and



connecting means adapted to interconnect electrically said rails to each other.

4,047,601

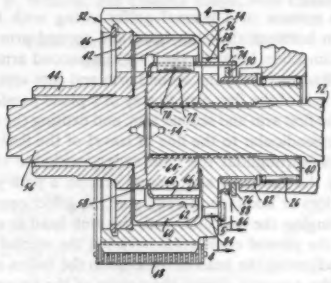
AUTOMATIC FOUR-WHEEL DRIVE TRANSFER CASE

Mark John Fogelberg, and Donald William Kelbel, both of Muncie, Ind., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 637,923, Dec. 5, 1975, abandoned. This application June 1, 1976, Ser. No. 691,672

Int. Cl.[2] F16D *41/10*

U.S. Cl. 192—36 **20 Claims**



1. A torque transfer assembly comprising a housing, an input shaft supported for rotation in said housing, first and second output shafts supported for rotation in said housing, and means coupling said input shaft with said output shafts for transfer of torque thereto, said coupling means including an overrunning clutch having wedging means movable between two clutch engaging positions wherein torque is transferred to said second output shaft and a clutch disengaging position wherein torque is not transferred to said second output shaft, means biasing said wedging means toward one of said clutch engaging positions, and means operable upon initial rotation of one of said shafts for blocking said movement of said wedging means to the other of said clutch engaging positions.

4,047,602

SYNCHRONIZING COUPLING

John H. Crankshaw, Erie, Pa., assignor to Dynetics, Inc., Pa.

Filed Dec. 11, 1975, Ser. No. 639,910

Int. Cl.[2] F16D *11/00*

U.S. Cl. 192—53 F **21 Claims**

1. A synchronizing clutch comprising

a drive shaft,

a driven shaft,

a driven clutch plate and

a driven gear and synchronizing means thereon

said synchronizing means being adapted to connect said drive shaft to said driven shaft,

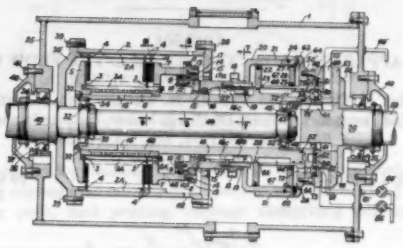
drive clutch plates and drive gear means on said drive shaft,

said synchronizing means comprising drive pins on said drive shaft adapted to loosely engage holes in said driven clutch plate,

blocking means,

liquid supply means adapted to apply a viscous drag to said clutch plates for engaging said blocking means,

said blocking means being adapted to prevent said drive pins



from engaging said holes until said driven shaft has reached synchronized speed,

means to disengage said blocking means thereby relieving pressure on said clutch plates and moving said drive pins into said holes when said driven shaft has reached synchronized speed,

whereby said drive shaft is connected to said driven shaft with torsional looseness,

said liquid means being adapted to move said drive gear into engagement with said driven gear after said drive pins have loosely entered said holes and said drive clutch plates have been disengaged from said driven clutch plate.

4,047,603

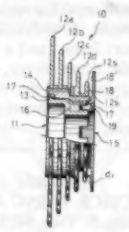
MULTI-SPEED BICYCLE FREE WHEEL ASSEMBLY

Nobuo Ozaki, Sakai, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan

Filed Feb. 5, 1976, Ser. No. 655,532

Int. Cl.[2] F16D *23/00*; F16H *11/08, 9/24*

U.S. Cl. 192—64 **3 Claims**



1. A multi-speed bicycle free wheel assembly comprising

a free wheel body,

a plurality of sprocket wheels which are different in diameter and are fixedly mounted in parallel to one another on said free wheel body,

a smallest sprocket wheel among said plurality of sprocket wheels being disposed outmost relative to other larger sprocket wheels,

said free wheel body including an inner ring or driven member, an outer ring or drive member, and a screw cup secured to one side of said free wheel body,

ratchet means interposed between said inner ring and said outer ring,

said screw cup having a substantially cylindrical screw cup body and an annular flange formed integral with said screw cup body,

said annular flange extending in confronting and parallel relation to said smallest sprocket wheel, and

said screw cup includes a threaded portion being designed to mate and engage a threaded portion of the driven member,

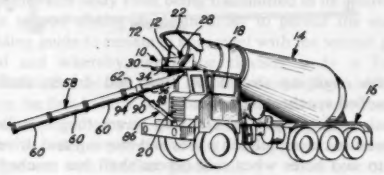
said screw cup also includes a bearing surface being designed to engage a bearing member positioned between the bearing surface of the screw cup and the drive member.

4,047,604

APPARATUS FOR CONTROLLING THE FLOW OF CONCRETE FROM A MIXER

Ralph R. Daoust, and Timothy N. Daoust, both of Anderson, Ind., assignors to Front Discharge Mixer, Inc., Anderson, Ind.

Filed Mar. 25, 1976, Ser. No. 670,552
Int. Cl.² B65G *11/12*
U.S. Cl. 193—10 **10 Claims**



1. A mechanism for controlling the direction of flow of concrete from the discharge opening of a concrete mixing drum, said mechanism comprising, in combination, a support frame, a concrete collecting hopper rigidly mounted on said frame adjacent said opening of said mixing drum for receiving concrete therefrom, outlet means on said hopper for the discharge of concrete therethrough from said hopper, rigid annular bearing means mounted adjacent said outlet means and on said support frame, driven gear means having an annular bearing portion for rotatably carrying said driven gear means on said annular bearing means for rotation about a substantially upright axis, hinge means defined on said driven gear means, an elongated pivotally carried by said hinge means for rotational movement with said driven gear means about said upright axis and for movement in a substantially upright plane, said chute having an upper end positioned for receiving concrete flowing through said outlet means, a hydraulic drive motor rigidly mounted on said support frame, and a drive gear operatively driven by said hydraulic drive motor, said drive gear operatively and drivably engaging said driven gear means for rotating said driven gear means and thereby said chute about said substantially upright axis.

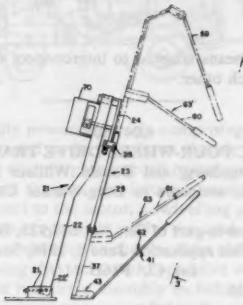
4,047,605

GOLF PRACTICE SWING APPARATUS

Leo Rosenvold, Wildrose, N. Dak. 58795

Continuation-in-part of Ser. No. 612,328, Sept. 11, 1975, abandoned. This application Feb. 10, 1976, Ser. No. 656,805
Int. Cl.² A63B *69/36*
U.S. Cl. 194—1 R **3 Claims**

1. A golf practice swing device comprising a base support with an inclined main post extending in length upward at an acute angle from vertical and toward a position wherein a golfer operator may stand to operate said device, a first arm pivotally mounted at its upper one end to said main post to rotate on an axis perpendicular to the length of the main post to rotatably move in a plane parallel to the main post with said axis extending downwardly from said post at an angle toward the position where a golf operator may stand, a second arm pivotally mounted at its one end to the lower end of the first arm to pivot generally parallel to the same plane as the first arm pivotally rotates in, a club head fixed to the other end of the second arm, said club head having a striking face fixed laterally and perpendicularly to the plane of movement of the first arm and second arm, a club shaft having its one end attached to the club head with its other end providing a handle for the golfer to grasp, said one end of said club shaft attached to said club head so that the club shaft may extend from the club head laterally to the plane of movement of the first arm and second arm upward toward the position where the golfer operator may stand with the handle at the upper end, whereby the golfer operator may grasp the handle of the club shaft and swing the club shaft to thereby swing the club shaft and club



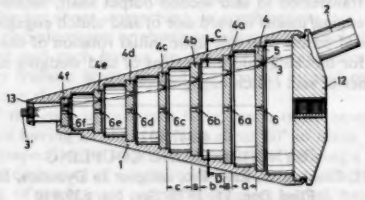
head in a manner of a normal golfer swing with the fixed connection between the club head and second arm and the pivotal connection between the first and second arm causing the club head to follow the second arm and first arm to pivot about the axis of the first arm to stay in a plane parallel to the plane of the first arm and second arm, and causing the club face to stay perpendicular to the line of travel of the first arm and second arm throughout the club swing, with the club head guided by the first arm and second arm in a path as would prevent slices or hooks to thereby give the golfer operator the feel of swinging the golf club with the club head in said path, and with the pivotal connection between the second arm and first arm adjusting the head of the club to the radius of the arc of the golfer operator during the course of the swing.

4,047,606

HEAD FOR NEEDLE PRINTER

Hubert Ott, Ulm, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Apr. 19, 1976, Ser. No. 678,357
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **3 Claims**



1. A printing head for needle printers having a plurality of printing needles respectively driven by drivers, the head having a conical housing whose base plate carries said drivers, the needles extending to and through the apex region of the housing, the tips of the needles extending from the housing at said

region being the front end of the head, the improvement comprising:

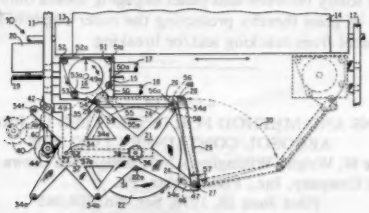
a plurality of guide plates in the housing disposed therein in spaced-apart relation to each other and spaced along the axis of the conical housing; and a plurality of bores in each of the plates for being passed through by the needles, the needles each having a curved contour and a particular diameter, the bores being composed of two cones with joined overlapping apices forming an entrance cone portion and an exit cone portion having larger height than the entrance cone portion, the narrowest portion of the bore being located where the entrance cone portion meets the exit cone portion having diameter only slightly larger than the needle passing through, each plate having a thickness at least in the region of the respective bores having value which is about eight to twelve times the diameter of the respective needle passing through, the bores in the guide plates being arranged, oriented and positioned in relation to each other, and configured as to follow the contour of the needles in that the exit cone portion of a bore in a plate of the plurality being closer to a tip of the needle passing through having a steeper cone angle than the exit cone portion of a bore in a plate of the plurality closer to the base plate and being passed through by the same needle.

4,047,607

ARTICULATED RIBBON-GUIDING STRUCTURE

Frederick P. Willcox, 565 Oenoke Ridge, New Canaan, Conn. 06840

Filed Apr. 1, 1976, Ser. No. 672,699
Int. Cl.² B41J *33/14*
U.S. Cl. 197—151 **32 Claims**



1. In a printing machine of the kind having a frame, and a printing carriage movable with respect to said frame along a printing path, said printing carriage comprising printing means,

the improvement comprising:

ribbon supply means carried by said frame and relatively stationary as compared to said movable printing carriage for storing a supply of ribbon, said ribbon supply means having an output,

ribbon directing means on the movable printing carriage for directing said ribbon past the printing means, said ribbon directing means having an input on said movable printing carriage, and

ribbon guiding means having one end supported adjacent said output for receiving ribbon from said supply means and another end connected to and moved by said printing carriage for supplying the ribbon to the input of said ribbon directing means,

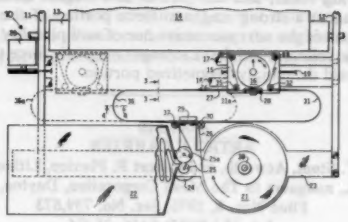
said ribbon guiding means including means that provides a substantially constant feed length between said output of the ribbon supply means and said input of the ribbon directing means irrespective of the position of said movable printing carriage along said printing path.

4,047,608

COMPLIANT RIBBON-GUIDING STRUCTURE

Frederick P. Willcox, 565 Oenoke Ridge, New Canaan, Conn. 06840

Filed Apr. 1, 1976, Ser. No. 672,710
Int. Cl.² B41J *33/06*
U.S. Cl. 197—151 **33 Claims**



1. In a printing machine of the kind having a frame, and a printing carriage movable with respect to said frame along a printing path, said printing carriage comprising printing means,

the improvement comprising:

ribbon supply means carried by said frame and relatively stationary as compared to said movable printing carriage for storing a supply of pliant ribbon, said ribbon supply means having an output,

ribbon directing means on the movable printing carriage for directing said ribbon past the printing means, said ribbon directing means having an input on said movable printing carriage, and

flexible ribbon-guide-means for guiding the pliant ribbon from the ribbon supply means to the ribbon directing means,

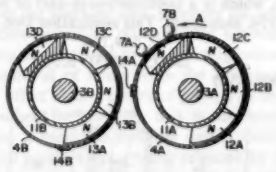
said flexible ribbon-guide-means including means uniformly flexible throughout its entire length for guiding the ribbon from said output to said input along a path of unvarying length irrespective of the position of said movable printing carriage along its printing path.

4,047,609

MAGNETIC ROLLER CONVEYOR

Iwao Nazuka, Tokyo, Japan, assignor to Buari Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 12, 1976, Ser. No. 685,688
Claims priority, application Japan, June 2, 1975, 50-66303
Int. Cl.² B65G *17/46*
U.S. Cl. 198—690 **13 Claims**



1. A magnetic roller conveyor for transporting objects, comprising a plurality of magnetic rollers arranged in a row in the transport direction of the roller conveyor, each of said magnetic rollers including:

a rotatable conveying roller,

a fixed inner barrel disposed within said rotatable conveying roller, and

magnet means on the outer periphery of said fixed inner barrel and extending over substantially half of the circum-

ference of said fixed inner inner barrel and extending over the vertex of said fixed inner barrel,

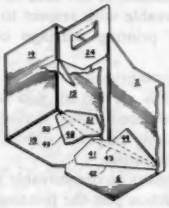
a last part of said magnet means which is past the vertex of said fixed inner barrel in the direction of rotation of said conveying roller comprising a dampingly magnetized portion whose magnetic force decreases, relative to the magnetic force of the remaining portion of said magnet means, gradually in said direction of rotation of said conveying roller, said last part of said magnet means being adjacent a strong magnetic force portion of the magnet means of the next successive one of said plurality of magnetic rollers which has a stronger magnetic force than that of said dampingly magnetized portion.

4,047,610

ARTICLE CARRIER

James T. Stout, Acworth, and Robert E. Plaxico, Lithonia, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Nov. 8, 1976, Ser. No. 739,873
Int. Cl.[2] B65D *5/46, 25/04*
U.S. Cl. 206—187 **7 Claims**



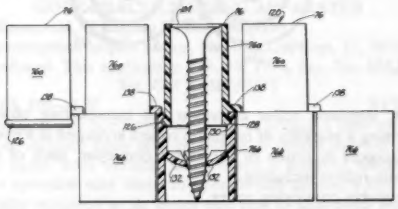
1. An article carrier comprising opposed side walls, end wall panels foldably joined to the end edges of said side walls and extending inwardly therefrom, riser panels foldably joined to said end wall panels remote from said side walls and extending medially inward of the carrier, a multiple ply handle secured to the upwardly extending portions of said riser panels, a bottom panel foldably joined to the lower edge of one of said side walls, a reinforcing panel foldably joined to said bottom panel, a web foldably joined to said reinforcing panel and disposed in overlapping relation therewith, and an attachment flap secured in flat face contacting relation with the lower part of the adjacent one of said end wall panels and foldably joined along one edge thereof to said web.

4,047,611

AIR-POWERED, SELF-FEEDING SCREW DRIVING TOOL

Harold E. Damratowski, Alda, Nebr., assignor to Triad Fastner Corporation, Alda, Nebr.

Division of Ser. No. 563,819, March 31, 1975, Pat. No. 3,971,421, which is a continuation-in-part of Ser. No. 446,023, Feb. 26, 1974, abandoned. This application Dec. 9, 1975, Ser. No. 639,164
Int. Cl.[2] B65D *85/24*
U.S. Cl. 206—347 **16 Claims**



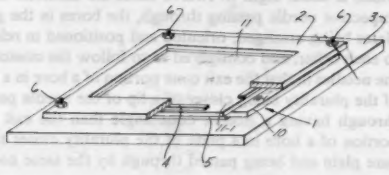
1. A belt of pods for use with an automatic fastener driving tool, each pod being adapted to contain a fastener of the type having a head and a shank, each of said pods comprising an upper portion and a lower portion joined together so as to be rotatable with respect to each other about a common pod axis such that said belt may be coiled and means enabling said belt to be twisted such that the axis of adjacent pods may be oriented non-parallel with respect to each other.

4,047,612

PACKAGING AND SUPPORTING MEANS FOR FLAT GLASS PANELS

Larry John Lohmann, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 5, 1973, Ser. No. 367,257
Int. Cl.[2] B65D *85/42, 81/02*
U.S. Cl. 206—454 **3 Claims**



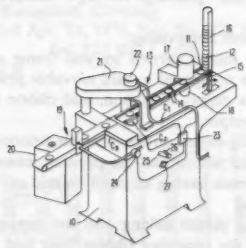
1. As an article of manufacture, a pair of frames adapted to be positioned on opposite sides of a glass display panel constituted by a pair of transverse glass plates joined by a ribbon of glass, the open center portion of each frame corresponding to the active viewing area of the display device bounded by said ribbon of glass, and means for fastening the two frames together in a compressive force relationship so as to protect the glass corners and edges of the display device each said frame having a panel engaging means, each said panel engaging means and said ribbon of glass being aligned in the direction of said compressive force, whereby said display panel is supported solely between said panel engaging means only at said ribbon of glass thereby protecting the outer edges of the display panel from cracking and/or breaking.

4,047,613

MEANS AND METHOD FOR INSPECTING IN-PROCESS AEROSOL CONTAINER CLOSURES

George W. Wright, Willingboro, N.J., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed June 28, 1976, Ser. No. 700,085
Int. Cl.[2] B65G *47/34*
U.S. Cl. 209—74 M **14 Claims**

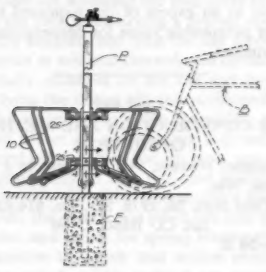


1. Apparatus for inspecting top closures for aerosol containers, said closures having an outer, peripheral depressed flange for receiving a quantity of sealing compound and an inner, curled flange, comprising:

conveying means for guiding closures in single file succession along a predetermined path, said path including an inspection position;

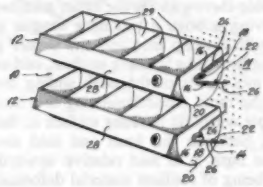
a first rotary inspection head axially aligned with a closure in an inspection position;
drive means for said inspection head;
a light source disposed in said head for directing a beam of light toward the periphery of a closure in said inspection position;
a first sensing means responsive to light from said source and disposed in said head to receive light from said source reflected by the periphery of the closure for outputting a first defect signal;
a second rotary inspection head axially aligned with a closure in an inspection position;
drive means for said second head;
electromagnetic transducer means disposed in said second head for applying an electromagnetic field to a portion of the inner, radial flange of a closure and for sensing a manifestation of field continuity in said flange;
second sensing means associated with said electromagnetic transducing means and responsive to sensed fluctuations in field continuity for outputting a second defect signal;
gating means responsive to the periodic advancement of closures for producing a discharge enabling signal so that spurious defect signals are not produced by the sucession of one closure by the next;
delay means for receiving said defect signals, said delay means being coupled to said gating means and to said sensing means for producing a reject signal a controllable time subsequent to the production of a defect signal; and
ejection means coupled to said delay means and responsive to said reject signal to eject a closure bearing a previously-sensed defect from said conveying means.

4,047,614
BICYCLE RACK
John R. Radek, Hinsdale, Ill., assignor to Ready Metal Manufacturing Company, Chicago, Ill.
Filed July 28, 1975, Ser. No. 599,819
Int. Cl.[2] A47F 7/04
U.S. Cl. 211—20 **2 Claims**



1. A wheel retaining bicycle support, comprising
a. a pair of similar, resilient wheel-embracing members formed of tenuous material and disposed in vertical, generally parallel planes, said members being spaced apart slightly less than the thickness of wheels to be supported, whereby wheels embraced thereby will be resiliently gripped by said members,
b. said members having upper and lower extremities and being generally of sigmoid formation in vertical profile, with two vertices projecting forwardly, at least one of said vertices being flared to form a mouth portion to receive a leading portion of a wheel,
c. said upper and lower extremities having substantially parallel terminal fingers remote from said vertices and bent transversely therefrom in a common vertical plane,
d. top and bottom mounting members permanently affixed to the respective fingers extending from the upper and lower extremities and deformed to provide means for affixing them to vertically disposed supporting means, said mounting members adapted to be selectively mounted in a plurality of angularly disposed planes relative to the plane of said support means, and
e. an intermediate connector between each mounting member and vertically disposed supporting means, said connector comprising a planar surface parallel to said supporting means and another surface extending angularly thereto for selective abutment of said mounting member with either of said surfaces to vary the angularity of said bicycle support relative to said supporting means.

4,047,615
MODULAR MERCHANDISING
Peter Browne, 27 Maughan Road, Baie D'urfe, Quebec, Canada (H9X 3E1)
Filed Nov. 5, 1975, Ser. No. 628,969
Claims priority, application United Kingdom, Aug. 8, 1975, 33237/75
Int. Cl.[2] A47F 5/12
U.S. Cl. 211—88 **5 Claims**

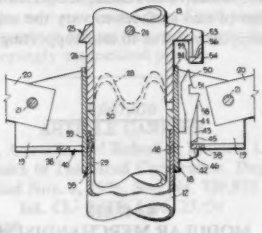


1. An improved merchandising unit comprising a shelving unit having opposed parallel end walls and a continuous outer wall which is substantially semi-cylindrical in configuration extending between outer edges of the end walls, upper edges of the end walls and continuous outer wall defining an open portion which lies in a substantially horizontal plane when the shelving unit is in an initial position, the end walls having trunnions mounted thereon, the trunnions pivotally supporting the shelving unit from a pair of cooperating support brackets mounted on a wall situated rearwardly of the shelving unit such that a longitudinal axis of the shelving unit is substantially horizontal, the trunnions permitting the shelving unit to be normally displaced from its initial position when a user removes items from the shelving unit, whereby the open portion assumes a position extending downwardly toward the user, thereby providing easier access to the shelving unit to facilitate insertion and removal of items from the shelving unit; the trunnions being offset from a centre of gravity of the shelving unit such that when the shelving unit is displaced from its initial position by a user, the shelving unit automatically returns to the initial position upon being released by the user;
means provided on at least one end wall cooperating with the adjacent support bracket to limit the amount of the tilting of the shelving unit between the initial position and the tilted position thereby prevent accidental spillage of contents situated within the shelving unit;
the semi-cylindrical configuration of the continuous outer wall permitting the mounting of the shelving unit with a rear portion thereof closely adjcent a vertical wall, the shelving unit being freely pivotable between its initial and tilted position without any portion thereof engaging said wall.

4,047,616
CLOTHES DRIER LATCH

Terence Dale Seabrook, 944-956 South Road, Edwardstown, Australia (5039)

Filed Mar. 10, 1976, Ser. No. 665,544
Claims priority, application Australia, Mar. 11, 1975, 867/75
Int. Cl.[2] A47F 5/00; A45B 25/08
U.S. Cl. 211—183 6 Claims



1. A latch useful on a clothes drier of the type wherein one member is slidable over another member, one of the members being a bush having a series of arms pivoted thereto and radiating therefrom, the arms being movable from a retracted position with the bush in a downward location to an extended operative position with the bush in a relative upward location, the latch comprising:

a latching body on one of the members and a striker plate co-operable therewith on the other member, the latching body having a boss, a retaining tongue and a latching tongue with a ramp face and the striker plate having a sliding surface and a latching surface, said ramp face upon upward movement of the bush sliding over the sliding surface, the ramp face terminating in a latching shoulder engageable with said latching surface to thereby effect an interlock between the bush and said another member when the bush is in said relative upward location, the tongues being of resilient material deformable away from the striker plate to effect interlock release and engagement,

said latching body also comprising a retaining shoulder spaced from one end surface of the retaining tongue to define a notch, said bush having a web which is engaged in said notch, said boss engaging a surface of said sliding bush when the web is engaged in the notch to thereby retain the latching body to the sliding bush.

4,047,617
LUFFING CRANE WITH OVERLOAD PROTECTION MECHANISM

Hans Tax, Munich, and Klaus Hosler, Eichenau, both of Germany, assignors to Hans Tax, Munich, Germany

Continuation of Ser. No. 635,244, Nov. 25, 1975, abandoned.
This application Sept. 27, 1976, Ser. No. 726,988
Claims priority, application Germany, Nov. 28, 1974, 2456359
Int. Cl.[2] B66C 13/48
U.S. Cl. 212—39 MS 8 Claims

1. A crane comprising:

a. a base;

b. an elongated boom;

c. a pivot securing one end of said boom to said base for angular luffing movement of said boom about a substantially horizontal axis;

d. two power-driven winches on said base;

e. two elongated flexible tension members respectively associated with said winches,

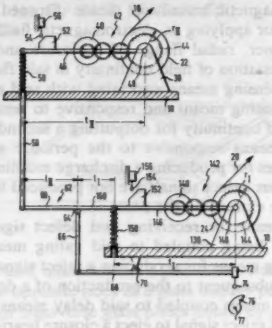
1. each tension member having one end portion attached to the associated winch, an intermediate portion trained over a longitudinal section of said boom spaced from said pivot, and another end portion depending from said section,

2. the spacing of said pivot from one of said sections and the end portion depending therefrom being different from the spacing of said pivot from the other section and depending end portion;

f. suspending means on each of said depending end portions for suspending respective loads from said tension members;

g. signal generating means for generating a mechanical stress signal in response to the stress transmitted to each winch by the associated tension member due to a suspended load;

h. weighting means for mechanically weighting each of said signals according to said spacing of the corresponding depending end portion from said pivot;



i. adding means for generating a mechanical signal indicative of the sum of the weighted signals;

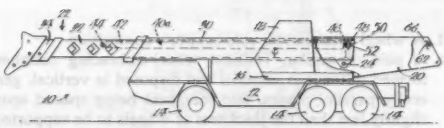
j. display means connected to said boom for simultaneous movement for displaying a mechanical signal indicative of the angular position of said boom relative to said base and of a maximum permissible value of said sum in the indicated angular position; and

k. comparator means responsive to said adding means and to said display means for comparing said maximum permissible value with the sum indicated by said adding means and responsive to an excess of the indicated sum over said maximum permissible value for deenergizing at least one of said winches.

4,047,618
CRANE CONSTRUCTION AND METHOD OF OPERATION

Donald A. Kuester, Wausau, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Sept. 18, 1975, Ser. No. 614,411
Int. Cl.[2] B66C 23/06
U.S. Cl. 212—58 R 4 Claims



1. In a crane having a fixed boom support thereon, a multisectional boom including a base section having a rear end pivoted on said support and at least one intermediate section telescoped within said base section and normally having an overhanging portion extending beyond the forward end of the base section in a retracted working position, a fluid ram having its cylinder connected to said intermediate section and a piston rod extending therefrom, first means on said base section defining a first connection for said piston rod adjacent the rear end of said base section, and second means on said fixed boom support rearwardly of the rear end of said base section defining a second connection for said piston rod, said second connect-

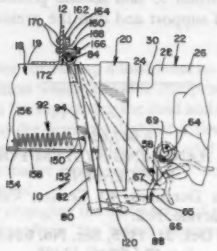
ing means having guide means for guiding said piston rod into alignment therewith so that said piston rod can be disconnected from said first connection on said base section, so that said piston rod can be extended, guided by said guide means into alignment with said second connection and connected to said second connection, whereby said cylinder can be retracted to move said intermediate section from said retracted working position to a stored position wherein said overhanging portion is telescoped into said base section and an opposite end portion is moved beyond said rear end of said base section to reduce the overall length of said crane.

4,047,619

UNCOUPLING DEVICE FOR ROTARY DUMP CARS

Osvaldo F. Chieriei, Elmhurst, Ill., assignor to Holland Company, Lombard, Ill.

Filed Mar. 1, 1976, Ser. No. 662,588
Int. Cl.² B61G *1/08, 3/08*
U.S. Cl. 213—166 **9 Claims**



1. In a railroad car having a body including a center sill projecting from one end of the car and equipped with a coupler striker and a bottom operating coupler mounted on the center sill, with the coupler being mounted for swinging movement sidewise of the car and including a pivotal lock lifter having a depending paddle for actuating the lock lifter to uncouple the coupler, with the lock lifter having a pivotal operating stroke to uncouple the coupler, and with the car having an uncoupling lever device at said end thereof, said device including an actuator pivotally mounted on the car and having a striker section underlying the center sill and positioned to be swung from under the center sill to strike the paddle to actuate the lock lifter, said center sill striker being disposed in a vertical plane and spaced outwardly of the car body end at said end of said car, longitudinally of said car, and including a handle structure operatively secured to the actuator for pivoting the actuator to strike the paddle and pivot the lock lifter about its operating stroke, and means for spring biasing the actuator to a retracted position in which said striker section thereof is disposed in a retracted position under the center sill and spaced from the paddle, the improvement wherein:

the actuator is mounted on said end of the car body for making said pivotal movement about a horizontal axis that is disposed at a level approximating that of the top of the center sill, with said horizontal axis being disposed between said car body end and the center sill striker and spaced inwardly of the car from the center sill striker longitudinally of the car and adjacent said body end,

said horizontal axis extending transversely of the car,

said handle structure comprising an operating rod portion journaled on the car in coaxial relation to said horizontal axis and a handle for pivoting said operating rod portion about said axis to pivot said actuator about said axis for striking the paddle for pivoting same about its operating stroke,

said actuator being proportioned radially of said axis to dispose said striker section thereof in substantial alignment with the plane of the center sill striker when said actuator is in its retracted position,

said actuator and said handle structure operating rod portion being free of securement to the center sill striker,

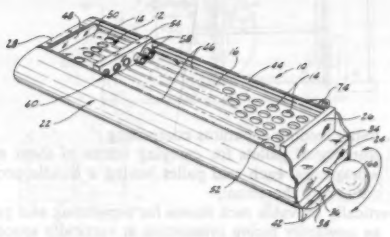
whereby both said actuator and said handle structure operate about said horizontal axis and said actuator striker section acts on the paddle with the leverage measured by the spacing of same radially of said horizontal axis, wherein the car body has a body end sill at said end thereof and said actuator and handle structure are mounted on said end sill, wherein said actuator striker includes a paddle striker, said paddle striker comprising a striker element fixed to said actuator striker section and projecting forwardly in the direction of the coupler paddle, said striker element along its forward edge being convexly curved to either side of the car in substantial conformance with the range of coupler swinging movement sidewise of the car for effecting said lock lifter pivotal operating stroke on striking same, under the operation of said handle structure, with the coupler positioned within said side swing.

4,047,620

PILL AND CAPSULE COUNTER

Warren L. Deininger, 14 Southern Drive, Decatur, Ill. 62521

Filed Oct. 10, 1975, Ser. No. 621,510
Int. Cl.² B65B *67/02*
U.S. Cl. 214—1 C **13 Claims**



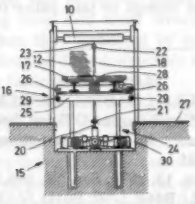
1. A counter for pills and capsules having a tray with pill and capsule receiving sides in back to back relationship, each side having a movable slide for selecting the number of recesses in said side to be filled, said tray being elongated and rotatable within a housing about a central axis to dispense the counted pills or capsules into said housing.

4,047,621

STACKING APPARATUS FOR FERROUS SHEETS

Lothar Stötzel, Buschhuttener Strasse 87, and Dieter Heider, Bottenbacher Strasse 73, both of 5910 Kreuztal-Buschhutten, Germany

Filed Mar. 18, 1976, Ser. No. 668,033
Int. Cl.² B65G *57/04;* B65H *31/26*
U.S. Cl. 214—6 DS **4 Claims**



1. Apparatus for forming a stack of ferrous sheets, comprising an endless conveyor belt having magnets for retaining ferrous sheets on the underside of the belt, the magnets being adapted to be de-energized to release the sheets to fall by

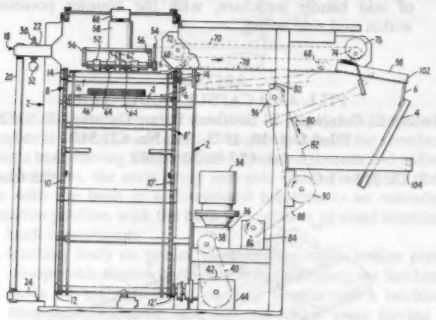
gravity, a pallet beneath the conveyor to receive the sheets in a stack, means to lower the pallet as the stack grows, vertical pins spaced to enter holes in the sheets, said pins being fixed against vertical movement when the pallet lowers, the pins having upper ends that are disposed closely adjacent the underside of the belt, and means for moving said pallet and pins laterally together as a unit to remove the formed stack from beneath the conveyor.

4,047,622

PALLET FEEDING APPARATUS

Hubert Blessing, Dallas, Tex., assignor to Levi Strauss & Co., San Francisco, Calif.

Filed July 16, 1976, Ser. No. 705,794
Int. Cl.[2] B65G *59/02*
U.S. Cl. 214—8.5 A **10 Claims**



1. Pallet feeding apparatus comprising

a plurality of pallets for carrying stacks of sheet material workpieces, each said pallet having a handle projecting outwardly therefrom;

vertically movable rack means for supporting said pallets in an upwardly facing orientation at vertically spaced positions;

means for removing sequentially the individual workpieces from the uppermost said pallet;

means for sensing the vertical position of the uppermost remaining workpiece of said sheet material on the uppermost said pallet and for generating a stack height control signal whenever said workpiece vertical position is below a predetermined level;

first motorized means for moving said rack means vertically upwardly in response to said stack height control signal, whereby the vertical position of the remaining uppermost sheet may be maintained generally constant;

means for sensing the absence of sheet material workpieces on said uppermost pallet in said rack and for generating a pallet removal control signal upon sensing of said absence; and

second motorized means responsive to said pallet removal control signal for gripping said handle of said uppermost pallet and for removing said handle and pallet from said rack means upon receipt of said pallet removal control signal.

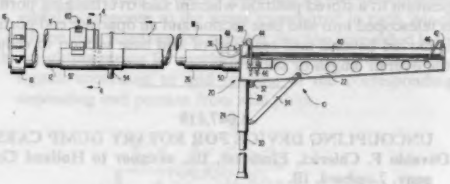
4,047,623

MODULE LOADING DEVICE

Robert Blevitt, and Miguel Eugene O'Brien, both of Santa Barbara, Calif., assignors to Ajax International Corporation, Santa Barbara, Calif.

Filed Aug. 13, 1975, Ser. No. 604,136
Int. Cl.[2] B66F *1/00*; B01D *31/00*
U.S. Cl. 214—17 C **12 Claims**

1. Apparatus for loading modules into a pressure vessel having at least one open end with a groove thereon adjacent said end comprising a frame, an elongated support carried by said frame for receiving a module, a pusher element carried by said frame for movement between a first position adjacent one end of said support and a second position adjacent the opposite end of said support, said element adapted to push a module along said support from the first to the second position, means for coupling the opposite end of said support to the pressure vessel at the open end thereof, said coupling means including a



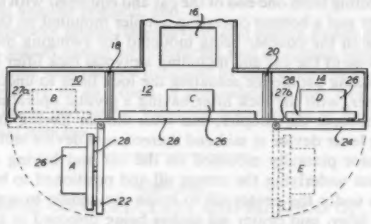
flange carried by said support and engageable in said groove to prevent relative endwise movement of said support and the pressure vessel, and means for moving said pusher element from said first position to said second position to move the module along said support and into the pressure vessel at its open end.

4,047,624

WORKPIECE HANDLING SYSTEM FOR VACUUM PROCESSING

Frederick William Dorenbos, El Cerrito, Calif., assignor to Airco, Inc., Montvale, N.J.

Filed Oct. 21, 1975, Ser. No. 624,498
Int. Cl.[2] C23C *13/08*
U.S. Cl. 214—17 B **13 Claims**



1. Apparatus for transporting at least one workpiece between the outside and the inside of a pressure sealable chamber, comprising:

a. a pressure sealable lock connected to the chamber having a gate aperture through which the workpiece is transportable between the inside of the chamber and the lock, and having a door aperture through which the workpiece is transportable between the lockk and the outside of the chamber;

b. a door movable between an open position and a closed position for sealing the door aperture;

c. means associated with the door for receiving, supporting and transporting the workpiece through the door aperture as the door is moved between its open and closed positions;

d. a gate movable between an open position and a closed position for sealing the gate aperture;

e. means mounted on the door for driving the workpiece and for conveying the workpiece through the gate aperture when the gate is in its open position;

f. means for receiving and supporting the workpiece inside the chamber; and

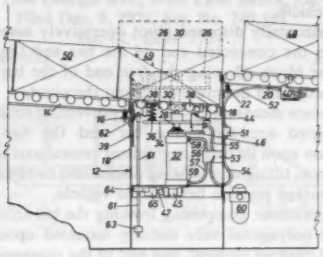
g. a pivot for supporting the door.

4,047,625

GRAVITY ROLLER CONVEYORS

Willson Barrat David Grant, Quappell, Little Frieth, Henley-on-Thames, Oxfordshire, England

Continuation-in-part of Ser. No. 472,046, May 21, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,279
Int. Cl.[2] B66F 9/06; B65G 47/00
U.S. Cl. 214—95 R 9 Claims



1. An elevator for raising a load from an infeed position to a discharge position which elevator comprises

a. a platform for supporting the load and adapted in use to be inclined to the horizontal about a first axis at the infeed position and inclined to the horizontal about a second axis at the discharge position, the first and second axes not being parallel,

b. means for changing the inclination of said platform during its elevation from the infeed position to the discharge position,

c. a low friction surface on said platform and provided by ball castors,

d. a pneumatic ram for elevating said platform and said load from the infeed position to the discharge position and for lowering said platform from the discharge position to the infeed position, the pneumatic ram being attached to the platform by the cooperation of a ball carried on said ram and a ball socket on the underside of said platform,

e. means preventing infeed of a load other than when the platform is in the infeed position, and

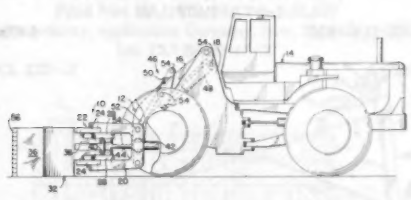
f. means preventing discharge of a load other than when the platform is in the discharge position.

4,047,626

CLAMSHELL BUCKET FOR WHEEL LOADER

Thomas C. Meisel, Jr., Phoenix, Ariz., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 24, 1975, Ser. No. 561,134
Int. Cl.[2] B65G 47/90
U.S. Cl. 214—147 G 8 Claims



1. A bucket assembly comprising:

a support frame;

a bucket comprising first and second jaws; first link means comprising a first pair of links, each pivotally connected to the support frame and first jaw;

second link means comprising a second pair of links, each pivotally connected to the support frame and second jaw;

each link being movable without direct connection to any other link;

the first and second pairs of links providing that the jaws are movable to open and closed states, said first and second pairs of links further providing that the open jaws are initially moved to an extent in a substantially open state with a generally rectilinear motion relative to the support frame and subsequently with a generally arcuate motion relative to the support frame to said closed state; and

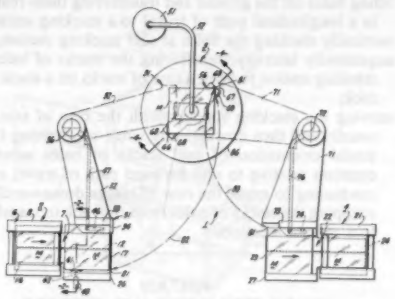
motion means pivotally mounted to the support frame and pivotally mounted to a link or a jaw for so moving the first and second jaws.

4,047,627

MASK PLATE HANDLING METHOD

Alan G. Flint, San Jose, Calif., assignor to GCA Corporation, Bedford, Mass.

Division of Ser. No. 510,284, Sept. 30, 1974, Pat. No. 3,960,277. This application Jan. 26, 1976, Ser. No. 652,514
Int. Cl.[2] B65G 47/91
U.S. Cl. 214—152 4 Claims



1. A method of handling polygonal masks to orient the masks in seqüence with their corners in a particular orientation prior to transferring said masks from an orienting station to a treating station, comprising:

A. providing a directional fluid bearing track structure at said orienting station,

B. feeding a series of polygonal masks in sequence from a supply thereof and positioning said masks in sequence upon said track structure,

C. providing stop means adjacent said track structure which includes an angular stop shoulder contoured in accordance with the corner configurations of said polygonal masks,

D. mounting said stop means along an edge of but separate from said track structure for movement relative to said track structure while said track structure remains stationary,

E. supporting said polygonal masks on a fluid cushioning emanating from said track structure and moving such masks when thus supported by said fluid cushion in sequence along said track structure with an edge thereof in generally leading relationship,

F. as each said polygonal mask moves along said track structure, urging each such mask generally laterally of said track structure while such mask is supported by said fluid cushion to move a corner thereof into close conformity with said angular stop shoulder of said stop means, and,

G. as each said polygonal mask in sequence is urged against said stop shoulder, grasping each such mask with transfer means and moving such mask away from said track structure to a treating station without disturbing the orientation of said corner imparted to each such mask by said stop shoulder.

4,047,628

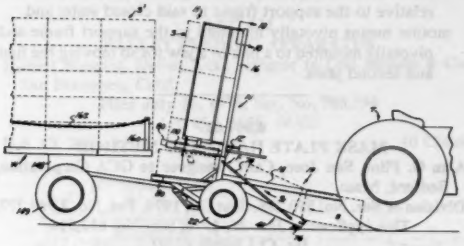
METHOD OF LOADING AND STACKING BALES

Allan R. Havens, 491 Somerset, Beaverton, Mich. 48602

Division of Ser. No. 389,494, Aug. 20, 1973, Pat. No. 3,941,266, which is a division of Ser. No. 227,850, Feb. 22, 1972, Pat. No. 3,807,579. This application Feb. 27, 1976, Ser. No. 662,034

Int. Cl.[2] A01D *87/12*; B65G *57/32*

U.S. Cl. 214—152 **4 Claims**



1. A method of loading and stacking bales comprising:

lifting bales off the ground and transferring them rearwardly in a longitudinal path of travel to a stacking station;

vertically stacking the bales at said stacking station;

sequentially laterally transferring the stacks of bales at the stacking station to form a row of stacks on a stack support rack;

moving the stacking support with the row of stacks rearwardly and then downwardly while maintaining the horizontal orientation of said stacks of bales substantially constant relative to said forward path of travel and then continuing to move the row of stacks downwardly while stripping the stacks of bales from the rack to transfer them to a remote location.

4,047,629

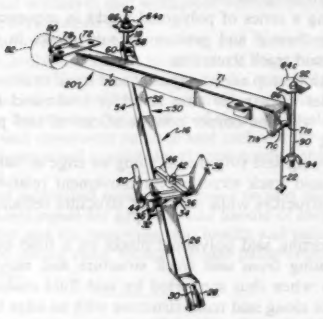
SPARE TIRE HOIST AND SUPPORT

Darrel J. Klein, R.R. 1, Box 10, Breckenridge, Minn. 56520

Continuation-in-part of Ser. No. 513,728, Oct. 10, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,077

Int. Cl.[2] B62D *43/04*

U.S. Cl. 214—451 **3 Claims**



1. An apparatus for hoisting and storing a spare tire beneath the body of a vehicle comprising,

a. an elongated support bar adapted to be mounted normally in a horizontal disposed position beneath the body of the vehicle, said supporting bar having a connected end and a free end,

b. a vertically disposed threaded mounting pin rigidly connected to the vehicle at one end and attached at the other end to the connected end of the supporting bar,

c. a threaded hangar block screw threaded upon the pin whereby the hangar block can be raised or lowered upon the pin by being turned thereupon to thereby raise or lower the connected end of the elongated tire supporting bar to accomodate tires of different sizes and the screw thread connection between the pin and the hangar block functions as a vertical pivot axis at the forward end of the elongated tire support bar to allow the free end thereof to swing freely from side to side about the vertical axis of the pin at the forward end of the bar for rear or side delivery of the tire as the tire is being removed or replaced beneath the vehicle,

d. a horizontally disposed pivot operatively associated between the connected end of the bar and the threaded hangar block allowing the free end of the bar to swing upwardly and downwardly about the pivot,

e. preventor means is provided for preventing rotation of the elongated tire supporting bar and the tire mounted thereon upon its own longitudinal central axis to keep the tire from tilting as it is being placed into or removed from the storage position beneath the vehicle,

f. said preventor comprising forming the bar from an elongated polyagonal tube slidably mounted upon an elongated channel element, one end of the elongated channel element extending from the end of the tube and being operatively connected to the vehicle by means of the horizontally disposed pivot whereby the channel and tube slidably mounted thereupon are free to swing up or down about said pivot and the horizontal pivot cooperating with the channel and tube is adapted to prevent the tube and tire mounted thereupon from rotating about the central longitudinal axis of the tube,

g. a tire mounting means secured to the tube between the connected and free ends thereof for fastening a tire to the tube,

h. a tire elevating means secured to the vehicle and operably associated with the free end of the tube, said elevating means including an elongated flexible connecting member having an end adapted to be fastened to the free end of the tube,

i. a screw lift including a housing, a shaft mounted for rotation therein, a means for rotating the shaft, a pull block connected to the shaft and connected to the upper end of the elongated connecting element so that the rotation of the shaft is adapted to move and pull block toward one end or the other of the screw lift to thereby raise or lower the elongated connecting element and the free end of the tire supporting tube to thereby lower the free end of the tube or raise it together with the tire to the storage position wherein the tire assumes a substantially horizontal position beneath the vehicle.

4,047,630

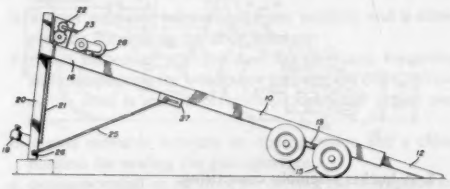
TILTABLE AND EXTENSIBLE TRAILER

Wilbur E. Young, Rte. 7, New Waterford, Ohio 44445

Filed Feb. 2, 1976, Ser. No. 654,573

Int. Cl.[2] B60P *1/28*

U.S. Cl. 214—506 **4 Claims**



1. A tiltable trailer consisting of a main frame, wheel and axle assemblies thereunder inwardly of the ends thereof for supporting the same, a tow bar and socket at one end of said frame by which the trailer may be towed, roller guide means on said frame adjacent said tow bar and socket, a perpendicular

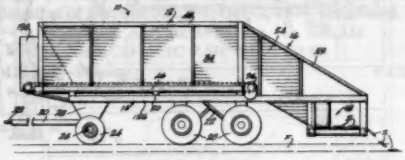
lifting arm movably engaging said roller guide means and means for moving the lifting arm substantially vertically with respect to the trailer so as to lift said end of the trailer and bring the other end thereof downwardly, said roller guide will inch said trailer forwardly.

4,047,631

SUGARCANE PLANTING DEVICE

Angel Diz, 1206 Georgia Ave., West Palm Beach, Fla. 33401

Filed Dec. 9, 1976, Ser. No. 749,161
Int. Cl.² B60P *1/38*
U.S. Cl. 214—519 **11 Claims**



1. A sugarcane planting device for planting sugarcane seed pieces in ground furrows comprising:

a trailer having front and rear ends and providing an enlarged hopper comprised of a pair of opposed side walls, a front wall and a floor defining a main inner chamber to receive a supply of sugarcane seed pieces, a main frame supporting the hopper, a first undercarriage portion fixed to said main frame and carrying a plurality of wheels, a second, front, undercarriage portion, a front wheel assembly pivotally carried by said front undercarriage portion, and a tongue and hitch assembly carried by said front wheel assembly for attachment to a tow vehicle;

a rear end extension providing a rear end chamber portion opening at a front end into said main inner chamber and being provided with a rearwardly downwardly angled floor and a central vertical divider wall defining a pair of opposed side chutes in said chamber portion with rear openings,

means to move the sugarcane seed pieces from said main inner chamber to said rear end chamber portion wherein the seed pieces are fed by gravity forces, by reason of said rearwardly downwardly angled floor, through said side chutes and out through said rear openings,

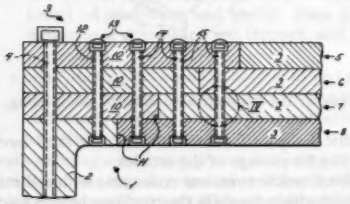
conveyor means fixed relative to each of said rear openings to receive the seed pieces emerging therefrom and to orient said pieces to a parallel relation to one of the furrows and to discharge the pieces thereinto.

4,047,632

PRESSURE VESSEL ESPECIALLY FOR A NUCLEAR REACTOR

Franz Schilling, Kempen, Germany, assignor to Siempelkamp Giesserei KG, Krefeld, Germany

Filed Nov. 26, 1975, Ser. No. 635,637
Claims priority, application Germany, Nov. 28, 1974, 2456379
Int. Cl.² B65D *45/00*
U.S. Cl. 220—3 **6 Claims**



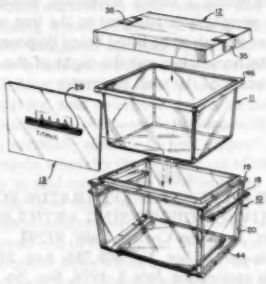
1. A pressure vessel especially for a nuclear reactor, comprising a cylindrical shell and at least one cover mounted on said shell and spanning the interior thereof, said cover comprising a plurality of generally planar superposed layers each of said layers comprising a central member and a plurality of sector shaped members surrounding said central member and bearing upon one another and upon said central member at respective joints, the joints of each layer being offset from the joints of the next-adjacent layer, said layers having mutually aligned passages forming throughgoing channels in said cover, and respective tensioning devices extending through said channels and traversing all of said layers and forming shear-resistant means between the layers of said cover, said tensioning devices bearing upon the upper and lower layers perpendicularly thereto.

4,047,633

ICE CONTAINER

Edgar F. Trombly, Grosse Pointe Farms, Mich., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Sept. 23, 1976, Ser. No. 726,076
Int. Cl.² B65D *13/02, 25/18*
U.S. Cl. 220—9 R **5 Claims**



1. A double-walled container comprising an outer container having a bottom and integral upstanding peripheral walls terminating at a top end, an inner container having a bottom and integral upstanding peripheral walls merging into a continuous top rim extending horizontally outwardly therefrom and turning downwardly into an inclined peripheral lip portion, the underside of said rim including a downwardly projecting rib forming a channel with said lip portion; said inner container located inside said outer container with the top end of said outer container inserted in said channel, the upstanding peripheral walls and bottom of the outer container being spaced apart from the upstanding peripheral walls and bottom of the inner container with at least part of the peripheral walls of the outer container being transparent; a decorative insert positioned between the spaced apart peripheral walls to be viewed through said transparent part said outer container upstanding peripheral walls including an outwardly extending peripheral ledge located below said top end, and a cover located over the container and supported by said ledge.

4,047,634

LID HAVING A SEPARABLE PANEL

Robert McGeehin, 36 Newlaithes Gardens, Horsforth, Leeds LS18 4JU, and Edward Dodsworth, 1 Grampian Close, Shelly, near Huddersfield, both of England

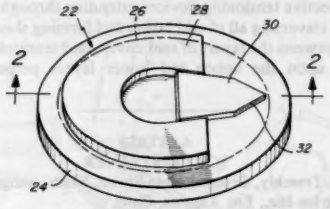
Division of Ser. No. 498,714, Aug. 19, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,019
Claims priority, application United Kingdom, Aug. 21, 1973, 39455/73
Int. Cl.² B65D *41/32*
U.S. Cl. 220—270 **2 Claims**

1. In a lid for a container wherein the lid is of the type having 1. a line of weakening defining a panel that can be removed

or bent to permit access to the interior of the container, and

2. a substantially rigid tab secured to the panel for causing fracture along a portion of the line of weakening by lifting one end of the tab,

the improvement for facilitating lifting of the tab and fracture along the remaining extent of the line of weakening comprising



a. a well in the panel, one end of the rigid tab protruding over the well whereby the tab end can be lifted by a finger inserted in the well, and

b. the panel including a raised horseshoe shaped portion whose outer periphery is adjacent to the line of weakening, the end of the tab to be lifted being disposed between the legs of the horseshoe, and the bight of the horseshoe forming a portion of the well perimeter.

4,047,635

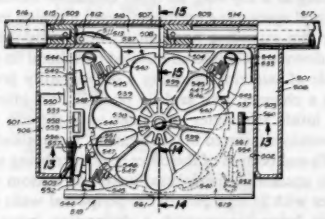
ARTICLE DISPENSING APPARATUS FOR SELECTIVELY DISPENSING ARTICLES

Arthur A. Bennett, Jr., West Covina, Calif. 91793

Continuation-in-part of Ser. No. 608,785, Aug. 28, 1975, abandoned. This application July 2, 1976, Ser. No. 702,235

Int. Cl.[2] B65G *1/00*

U.S. Cl. 221—5 **10 Claims**



1. An apparatus for dispensing preselected pharmaceutical doses in readily handled units such as in pill or capsule form, the apparatus comprising:

a. a housing structure;

b. a plurality of magazines arranged to be removably received in the housing structure, each magazine adapted to contain a plurality of preselected similar pharmaceutical dosages differing from the dosages in the other magazines;

c. means for activating selected magazines to cause discharge of a dosage from each selected magazine to produce a preselected multiple dosage;

d. each magazine including means providing access to the dosages contained in the magazine and lock means for each magazine to prevent unauthorized access to the dosage therein;

e. and other lock means preventing discharge of dosages when the magazine is removed from the housing structure.

4,047,636

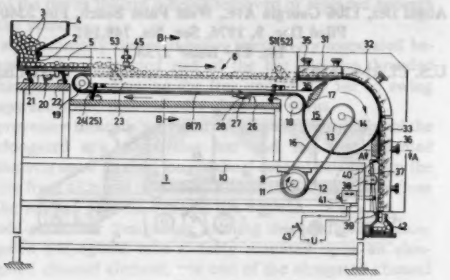
DEVICE FOR THE ARRANGEMENT, ALIGNMENT AND CORRECTLY POSITIONED FEED OF ARTICLES IN PARTICULAR HAVING ELONGATED SHAPE

Hans List, Lau-Strasse 51 (BRD), 7 Stuttgart 70, Germany

Filed Sept. 10, 1975, Ser. No. 611,977

Int. Cl.[2] B23Q *7/12*

U.S. Cl. 221—161 **23 Claims**



1. A device for the arrangement, alignment, and correctly positioned supply of elongated articles to receptacles, a further processing station, and the like, said device comprising a supply receptacle holding a multiplicity of said articles; a distributor means spaced from said supply receptacle for delivering a predetermined number of said articles to each of a plurality of receiving receptacles; a forward transport means for transporting articles from a supply station at said supply receptacle to said distributor means in aligned position, said forward transport means including at least two drive rollers, at least two deflecting rollers, and at least two endless spiral springs each spanned over a respective one of said drive and deflecting rollers; and return transport means for transporting from said distributor means to said supply station articles which were not correctly positioned in said forward transport means and which have fallen therefrom.

4,047,637

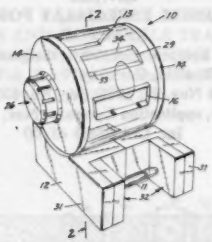
PAPER CLIP DISPENSER

Jerome A. Grunstad, West St. Paul, and Richard G. Eischens, Edina, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 3, 1976, Ser. No. 747,361

Int. Cl.[2] B65H *3/66*; G07F *11/24*

U.S. Cl. 221—265 **6 Claims**



2. A dispenser for magnetizable articles, comprising:

a base;

a cylindrical shell affixed to the base, the shell having an axial slot for passage of the articles;

a cylindrical article container concentric with and rotatably mounted within the shell, the container having a side wall and end walls and having a knob extending from at least one end wall for rotating the container within the shell and having at least one axial slot for passage of the articles

to deliver the articles one at a time to the shell slot for dispensing therefrom upon rotation of the container; and

a pair of spaced magnets affixed to said base proximate the end points of the shell slot, the magnets providing a magnetic field in the space therebetween for intersecting the paths of the dispensed articles and suspending the articles in the space.

4,047,638

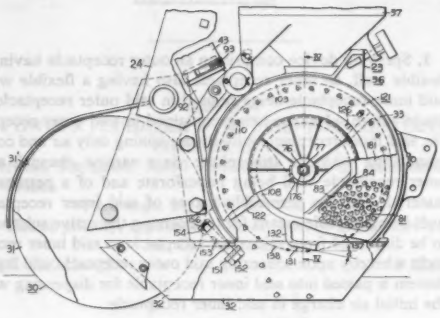
SEED DISC FOR AN AIR PLANTER

Paul H. Harrer, and LeRoy Langford, both of LaPorte, Ind., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 511,385, Oct. 2, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,332

Int. Cl.[2] A01C *7/04*; B65G *29/00*

U.S. Cl. 221—266 **6 Claims**



1. A seed disc for an air planter having means to rotatably drive said disc, a seed cavity and a seed drop portion, said seed disc comprising:

a relatively rigid central portion adapted for connection to said drive means whereby said disc is rotated about its axis in one direction of rotation when said planter is engaged in a planting operation, said axis being substantially horizontal and transverse to the direction of travel of said planter during the planting operation, and

a radially outer portion having

walls defining a plurality of circumferentially spaced pockets in one axial side of said disc, each of said pockets having

an axially extending surface defining a shelf at the trailing edge of said pocket operable to assist in supporting a kernel of seed in said pocket as said disc is rotated in said one direction to move said pocket in an upward arc,

a gently sloping surface from the bottom to the leading edge of said pocket facilitating movement of a kernel of seed into said pocket as said pocket communicates with said seed cavity during rotation of said disc in said one direction and facilitating dropping of said kernel of seed from said pocket when said pocket moves in a downward arc through said seed drop portion, and

a small opening between the bottom of said pocket and the other axial side of said disc, said opening being sufficiently small to prevent passage therethrough of kernels being planted and

walls defining a camming groove extending circumferentially in said one direction of rotation of said disc and radially inwardly from each pocket whereby said camming groove urges seed radially outwardly toward its associated pocket as said disc is rotated through a quantity of bulk seed.

4,047,639

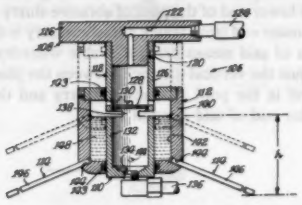
ABRASIVE SLURRY REGULATOR ASSEMBLY

David M. McNamara, Arlington Heights, and Stephen A. Boettcher, Deerfield, both of Ill., assignors to Speedfam Corporation, Des Plaines, Ill.

Division of Ser. No. 520,608, Nov. 4, 1974, Pat. No. 3,991,918. This application Aug. 23, 1976, Ser. No. 716,548

Int. Cl.[2] B67D *3/00*

U.S. Cl. 222—64 **5 Claims**



1. A regulator assembly for controlling the flow of an abrasive slurry, comprising

a support,

body means secured to said support and defining a cavity containing a pool of abrasive slurry therein and having a vertical elongated opening in the side thereof,

overflow means secured to the side of said body means for establishing the upper level of a pool of abrasive slurry in said cavity, said overflow means including an overflow receptacle secured to said support, with said body means being vertically slidable on said support and said overflow receptacle whereby the upper level of the pool of abrasive slurry in said cavity may be selectively adjusted, and

a least one flow restrictive conduit means secured at one of said body means and communicating with said cavity at the lower end of the pool of abrasive slurry and presenting an outer end from which abrasive slurry is discharged, and one of said means being movable whereby to selectively adjust the vertical distance between the plane of the upper level in the pool of abrasive slurry and the plane of the outer end of said conduit means.

4,047,640

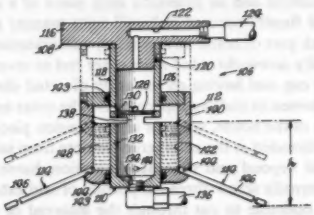
ABRASIVE SLURRY REGULATOR ASSEMBLY

David M. McNamara, Arlington Heights, and Stephen A. Boettcher, Deerfield, both of Ill., assignors to Speedfam Corporation, Des Plaines, Ill.

Division of Ser. No. 520,608, Nov. 4, 1974, Pat. No. 3,991,918. This application Aug. 23, 1976, Ser. No. 716,837

Int. Cl.[2] B67D *3/00*

U.S. Cl. 222—64 **4 Claims**



1. A regulator assembly for controlling the flow of an abrasive slurry, comprising

a support,

body means secured to said support and defining a cavity containing a pool of abrasive slurry therein and having a vertical elongated opening in the side thereof,

overflow means secured to the side of said body means for

establishing the upper level of a pool of abrasive slurry in said cavity, said overflow means including a sleeve member vertically slidable on said body means and having an aperture aligned with and vertically positionable along said elongated opening whereby the upper level of the pool of abrasive slurry in said cavity may be selectively adjusted, and

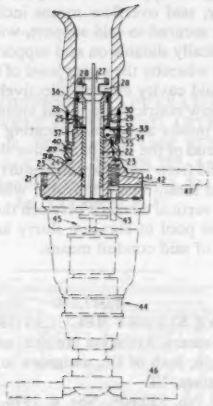
at least one flow restrictive conduit means secured at one of said body means and communicating with said cavity at the lower end of the pool of abrasive slurry and presenting an outer end from which abrasive slurry is discharged, and one of said means being movable whereby to selectively adjust the vertical distance between the plane of the upper level in the pool of abrasive slurry and the plane of the outer end of said conduit means.

4,047,641

LIQUID DISPENSING CONTAINERS WITH CUTTER FOR PREVENTING REFILLING

Francis Alfred Delaney, Formby, England, assignor to Sinanan Enterprises Limited, London, England

Filed Oct. 24, 1975, Ser. No. 625,378
Int. Cl.² B65D *47/02, 49/12*
U.S. Cl. 222—80 **8 Claims**



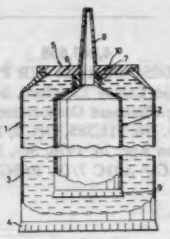
1. A bottle like container having a main body part and a neck part integral with said body part made of glass or like hard and rigid material and an extension neck piece of a softer plastics material fixedly secured in liquid-tight manner at one end to said neck part of bottle or container, said extension piece being externally screw-threaded at its other end to co-operate with a closure cap and having an inwardly directed shoulder formation between its ends and spaced from the outer end of the neck portion of the bottle, wherein said extension piece is internally screw-threaded at the end thereof remote from said bottle neck part and beyond said shoulder formation, having engaged in said internally screw-threaded portion of said extension piece a device operable to cut through the material of said shoulder formation upon rotation thereof relative to said extension piece whereby to sever said internally screw-threaded portion from the remainder of the extension piece upon rotation of said device in operated state, wherein said device includes at least one cutter member pivotally movable between a first position in which said cutter member is retracted into the body of the device and inoperative and a second position in which said cutter member projects from the body of the device for cutting engagement with said shoulder formation.

4,047,642

SPRAYING DEVICE

Billy Nils Nilson, 595 00 Mjolby, Sweden

Filed Mar. 21, 1974, Ser. No. 453,344
Claims priority, application Sweden, Mar. 22, 1973, 7304094
Int. Cl.² B65D *35/28*
U.S. Cl. 222—94 **1 Claim**



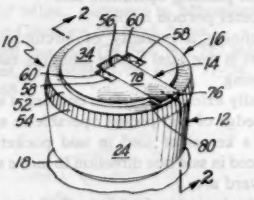
1. Spraying device comprising an outer receptacle having a flexible wall, an inner receptacle also having a flexible wall, said inner receptacle being housed in said outer receptacle, a liquid active substance being contained in said outer receptacle, said inner receptacle initially containing only air and communicating with the atmosphere via a narrow channel, said inner receptacle wall being imperforate and of a permeable material, and the permeable nature of said inner receptacle wall being the sole means for transferring the active substance to be dispensed from said outer receptacle to said inner receptacle whereby upon squeezing said outer receptacle said liquid therein is passed into said inner receptable for dispensing with the initial air charge in said inner receptacle.

4,047,643

SAFETY DISPENSING CLOSURE WITH MOVABLE RETAINER

Robert E. Hazard, North Kingstown, R.I., assignor to Polytop Corporation, Slatersville, R.I.

Filed Mar. 20, 1972, Ser. No. 235,970
Int. Cl.² B65D *55/02*
U.S. Cl. 222—153 **13 Claims**



12. A closure having a closure body including means for holding said closure body with respect to a container so that it is incapable of being removed from a container during the normal utilization of said closure and having an opening extending therethrough, said closure also having a spout rotatably mounted on said closure body so as to be capable of being rotated between a closed position in which said opening in said closure body is closed off by said spout and an open position in which a passage within said spout is in alignment with said opening, said spout extending from said closure body when in said open position and extending adjacent to said closure body when when in said closed position, said spout being mounted on said closure body so as to be incapable of being removed from said closure body during movement between said open and said closed positions during normal utilization of said closure, in which the improvement comprises:

a retainer for engaging said spout so as to hold said spout against rotation when said spout is in said closed position,

cooperating means on said retainer and said closure body for movably mounting said retainer on said closure body so that said retainer is incapable of being separated from said closure body during the normal utilization of said closure and so that said retainer is capable of being moved with respect to said spout and said closure body between locked and unlocked positions,

in said locked position said retainer being located so as to physically prevent movement of said spout from said closed position and in said unlocked position said retainer being located so as to be spaced relative to said spout so as to permit said spout to be rotated between said opened and closed positions,

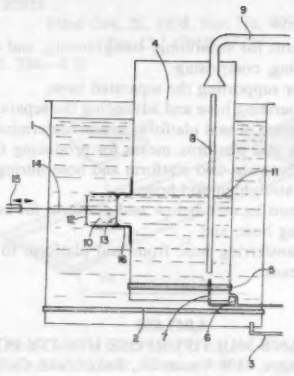
said retainer being accessible from the exterior of said closure so as to be capable of digital engagement so that it can be moved with respect to said closure body and said spout.

4,047,644

POWDER FLUIDIZER WITH FEED FOR CONSTANT POWDER LEVEL

Fernand Raymond, 38330 chemin du Manival, Saint-Ismier, France

Filed Sept. 15, 1975, Ser. No. 613,421
Claims priority, application France, Oct. 9, 1974, 74.34715
Int. Cl.² B65D *83/06*
U.S. Cl. 222—193 **7 Claims**



1. A distributor for supplying powdered solid products to apparatus utilizing such products, said distributor comprising:

a first container to which said product is supplied,

a second container from which said product is delivered to said apparatus,

means for fluidizing the powdered solid product in both containers,

and means for maintaining the level of said product in said second container at approximately a predetermined level, said means for maintaining the level of said product comprising at least one lock-chamber connecting said first and second containers, said lock-chamber comprising an inlet to said second container, the upper portion of said inlet terminating in said second container at said desired level, together with means for opening said at least one lock chamber alternately to one of said containers and then to the other but preventing the formation at any time of an open passage from one container through said lock chamber to said other container.

4,047,645

AEROSOL DEVICE WITH TELESCOPING CONTAINER PARTS

Joseph L. Caliendo, 578 Driggs Ave., Brooklyn, N.Y. 11211

Filed June 8, 1976, Ser. No. 693,867
Int. Cl.² B65D *35/28*
U.S. Cl. 222—386.5 **7 Claims**

1. An aerosol device, comprising

airtight container means;

an airtight flexible membrane in the container means containing fluid material under pressure and compressed gas gastightly separated from the fluid material;

pressure means for manually increasing the pressure on the fluid material in the container means, the container means and pressure means comprising a pair of containers constituting an upper container and a lower container telescopically slidably mounted one within another, the upper container being mounted in the lower container, the lower container having a larger diameter for movement in axial directions, wherein dispensing pressure is maintained by gradually telescoping the upper and lower containers towards each other; and

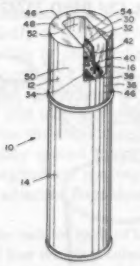
spray valve means in the container means for spraying the fluid material out of the container means under manual control.

4,047,646

CHILD-SAFE AEROSOL ACTUATOR

Mei-Kuo Lo, and Erwin Sheppard, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed July 21, 1975, Ser. No. 597,856
Int. Cl.² B65D *83/14, 55/02*
U.S. Cl. 222—402.13 **27 Claims**



1. A device for use with pressurized dispensers and adapted to prevent valve actuation by finger pressure of human fingers of less than predetermined dimensions while allowing actuation by fingers of greater than said predetermined dimensions, comprising an actuator member having an exposed surface, said surface having effective and ineffective areas, said effective area nondepressible by a finger of less than said predetermined dimensions, and said ineffective areas having substantially sharp finger-repelling means thereon which would cause

substantial discomfort to the human finger when applying valve-actuating pressure thereto, whereby the finger pressure required for valve actuation is effectively applied only to said effective area.

4,047,647

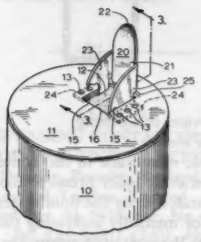
DISPENSER FOR GRANULAR MATERIAL

Richard C. Lewis, 464 Green Bay Road, Winnetka, Ill. 60093

Continuation-in-part of Ser. No. 389,165, Aug. 17, 1973, Pat. No. 3,908,873. This application Sept. 26, 1975, Ser. No. 617,024 The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.

Int. Cl.[2] B67D *3/00*

U.S. Cl. 222—480 **10 Claims**



1. A dispenser for pouring or sifting granular material having an apertured wall and including a trapezoidal pouring aperture and a plurality of sifting apertures; a spout having a first closure panel of generally trapezoidal shape adapted when in a first position of pivotal adjustment to overlie and seal off said pouring aperture; a pair of spout sidewalls extending from opposite sides of said closure panel and inwardly of said pouring aperture; and second closure means carried by at least one of said sidewalls within said dispenser adapted to seal off said sifting apertures when said first closure panel is in a second position of pivotal adjustment, said pouring aperture discharging through said spout when said closure panel is in said second position and said sifting apertures are unsealed when said closure panel is in said first position.

4,047,648

SPOUT WITH SNAP ACTING COVER AND DRAIN HOLE

Jack V. Croyle, Woonsocket, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed May 7, 1976, Ser. No. 684,342

Int. Cl.[2] B65D *25/42*

U.S. Cl. 222—498 **1 Claim**

1. A container for dispensing liquids comprising a container portion having a bottom wall and continuous upstanding peripheral walls terminating at an upper edge, a seal engaging said upper edge in a liquid-tight manner, a pouring spout extending upward from said seal, a cap movable to a position over the pouring spout to seal the pouring spout, said cap having an integral elongated strap with a trunion on the end thereof, a pair of spaced lugs integral with the seal and spaced from the pouring spout a sufficient distance to permit the trunion to pivot in the lugs in moving said cap to a sealing position over the pouring spout said strap and trunion including means that extend beyond said trunion, said means being engagable with the seal upon rotation of said cap to a position removed from its sealing position over said pouring spout thereby maintaining said cap in the non-sealing position.

4,047,649

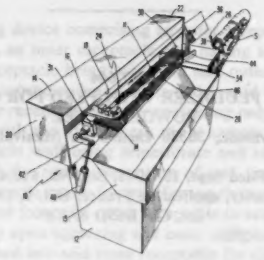
APPARATUS FOR HANDLING HOSIERY

Clifton Gregory, Hickory, N.C., assignor to Marvel Specialty Company, Hickory, N.C.

Filed Feb. 10, 1976, Ser. No. 656,901

Int. Cl.[2] A41H *43/00*

U.S. Cl. 223—43 **14 Claims**



1. An apparatus for separating, straightening, and stacking hose from a string, comprising:

a platform for supporting the separated hose;

means for separating hose and advancing the separated hose along a surface of said platform to a predetermined, fixed location on said platform, means for producing frictional resistance between said platform and hose during pulling serving to straighten said hose;

receiving means located below said platform for collecting and stacking hose; and

means for transferring hose from said platform to said receiving means.

4,047,650

SPORTSMAN'S MULTIPURPOSE UTILITY POUCH

John M. Domingos, 3108 Vassar St., Bakersfield, Calif. 93306

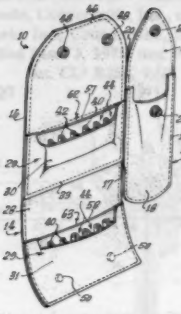
Filed Mar. 29, 1976, Ser. No. 671,027

Int. Cl.[2] F41B *13/04*; F42B *39/08*

U.S. Cl. 224—2 B **3 Claims**

1. A sportman's multipurpose utility pouch adapted to be transported on the user's belt, comprising a unitary backing panel having formed thereon the combination of a knife sheath section and an ammunition section disposed immediately adjacent thereto, a sheath panel fastened to said backing panel to define a knife pocket, a portion of said backing panel above said knife sheath panel defining a safety flap disposed thereabove and being foldable into selective engagement with said sheath panel to secure a hunting knife or the like nested therein, said ammunition section comprising a series of longitudinally spaced pockets, each said pocket being formed by means of a number of contiguous intermediate panels being secured to one another along three peripheral edges thereof and to said backing panel thereby defining with said backing panel adjoined upwardly opening enclosures; means provided in one of said adjacent enclosures sandwiched between adjacent ones of said intermediate panels for securing ammunition in discreet spaced relation causing said ammunition to be se-

curely nested between said adjacent panels except that a small portion thereof extends beyond said means to thereby permit handling of said ammunition, said backing panel extending beyond said pockets to thereby provide a closure flap, said backing panel being foldable between said pockets to thereby



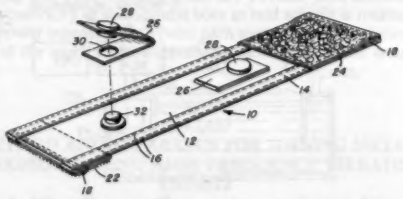
bring said pockets into protective face to face juxtaposition; and said backing panel having fastening means disposed thereon and located such that when said pockets are folded into juxtaposition said flap may be folded over said pockets and fastened to protect the contents of said pockets.

4,047,651

WATCH BAND

Richard Arnold McMullen, 2752 Choctaw Drive, Melbourne, Fla. 32935

Filed Oct. 25, 1973, Ser. No. 409,404
Int. Cl.² G04B *37/14*
U.S. Cl. 224—4 D **3 Claims**



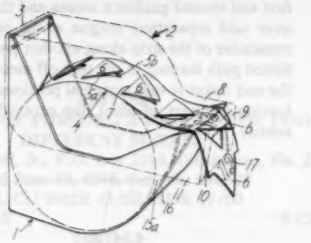
1. A fabric watch band comprising an elongated fabric strap having upper and lower sides, opposed longitudinal edges and first and second end portions, said first and second portions of the strap being reversely bent on the strap to the opposite sides thereof to form finished end edges, a pair of complementary pressure attachable components positioned to the opposite sides of said strap in overlying and concealing relation to the reversely bent end portions, and stitching securing each component and underlying reversely bent end portion to the strap, said pressure attachable components being formed of a fabric-like material incorporating releasably engageable hook-like elements on one component and loop-like elements on the second component and watch mounting means fixed to one side of the strap, said watch mounting means comprising a pair of loops, each loop comprising a length of material having the opposed ends positioned in generally overlying relation to each other, and means fixing the loop ends to the strap, said means fixing the loop ends to the strap comprising a pair of complementary fastener components, one fastener component being fixed to the strap and the second fastener component being fixed to one end of the loop, the second end of the loop having an aperture therethrough freely positionable in overlying relation to the strap about the strap mounted fastener component whereby the two fastener components can be interlocked with the apertured end of the loop trapped therebetween for a combined removable mounting of the loop on the strap and a closing of the loop for the retention of a watch.

4,047,652

TICKET DISPENSING ASSEMBLY FOR DISPENSING TICKETS FROM A FLEXIBLE STRIP

Ake Ehrlund, Alvkvarnsvagen 177, Spanga, Sweden

Division of Ser. No. 520,865, Nov. 4, 1974, which is a division of Ser. No. 326,457, Jan. 24, 1973, Pat. No. 3,885,724. This application July 7, 1976, Ser. No. 703,313
Claims priority, application Sweden, Jan. 26, 1972, 846/72
The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.
Int. Cl.² B26F *3/02*
U.S. Cl. 225—54 **7 Claims**



1. A ticket dispensing assembly for dispensing tickets from a flexible strip comprising:

a container comprising

a casing and

a cover pivotally connected with said casing and

a roll of flexible strip material positioned in said container with the end of said strip protruding from said container and from which ticket pieces are intended to be torn off, said strip roll comprising

a strip of flexible material from which single pieces of one and the same predetermined length are intended to be torn off and having a pair of marginal edges and a feeding direction away from said roll,

said strip having a series of longitudinally spaced apart penetrated lines,

each of said lines shaped and adapted to form an individual tongue shaped flap,

each of said lines starting from a point adjacent to but spaced inwardly of said strip from one of said marginal edges extending in said feeding direction of said strip toward the centerline thereof, and on the other side of said centerline extending back opposite said feeding direction of said strip to a point adjacent to but spaced inwardly from the other marginal edge of said strip,

said flaps equally spaced longitudinally along said strip with the longitudinal spacing between corresponding portions of adjacent flaps equal to said predetermined length,

the points at the ends of each of said penetrated lines lying on a straight line which is substantially perpendicular to the longitudinal direction of the strip and with each flap firmly connected to the remainder of said strip along said straight line between said points,

the end of each of said flaps remote from said firmly connected portion having a width smaller than that of said firmly connected portion and with the smaller end of each flap directed forwards in said feeding direction of said strip and dimensioned to be gripped for pulling the strip and tearing a single end piece from said strip, and

marginal strip portions at both sides of each flap between

the end points of said penetrated line and the adjacent marginal edges of said strip and connecting all of said pieces of predetermined length in said strip,

first guidance means being combined with said cover, and second guidance means and tear-off means being combined with said casing,

said second guidance means including a separation tongue located at the strip exit point,

said tear-off means being located on both sides of said second guidance means and extending from the base of said separation tongue laterally outwardly beyond the marginal edges of said strip, and

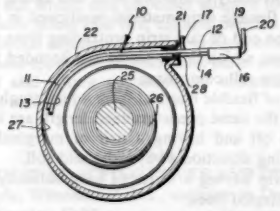
said separation tongue having a shape corresponding to the shape of the bottom part of said flaps in order to, during passage of the strip in response to a pull on the end of said strip protruding from said assembly, first guide the strip along a predetermined path between said first and second guidance means and then guide the flap over said separation tongue along one path and the remainder of the strip along another path, said last-mentioned path leading to the tear-off means for tearing off the end ticket at said marginal portions of said strip and leaving the next adjacent flap protruding from the assembly.

4,047,653

FILM RETRIEVER

Michael T. Starr, 16 Old Faith Road, Shrewsbury, Mass. 01545

Filed Feb. 23, 1976, Ser. No. 660,691
Int. Cl.[2] G03B 1/56
U.S. Cl. 226—92 2 Claims



1. A device for retrieving the film leader from the inside of a film cartridge, comprising:

a. an outside jaw end,

b. an inside jaw end, each jaw end having a curved cylindrical surface with a radius approximately equal to that of the cartridge, each jaw end being attached to a generally flat base, and each jaw end and base being formed of a thin sheet of resilient material,

c. an inserting means adapted to allow the insertion of the jaw ends into the film cartridge,

d. a separating means adapted to cause separation of the jaw ends from time to time while they are in the cartridge, and

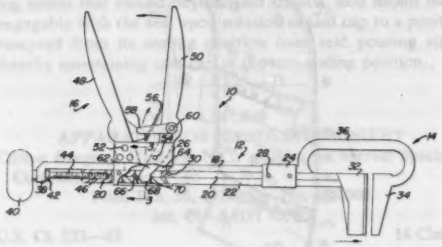
e. a closing means adapted to bias the jaw ends toward one another from time to time while they are in the cartridge, the bases of the jaws being secured parallel to and are linearly slideable with respect to one another to form the separating and closing means, the combined thickness of the bases being substantially less than the smallest dimension of a tangentially-opening entrance in the cartridge, so that the device can pass through the entrance to form the inserting means and the bases can slide with respect to one another while in the entrance, a portion of one of the bases wrapping around a portion of the other base to hold the bases in parallel and to allow linear relative movement.

4,047,654

SURGICAL STAPLER

Alfredo Alvarado, 9114 Dale Road, Philadelphia, Pa. 19115

Filed June 23, 1976, Ser. No. 699,027
Int. Cl.[2] B25C 5/02
U.S. Cl. 227—19 11 Claims



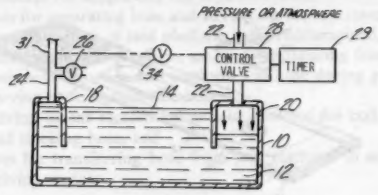
1. A surgical stapler for intralumenal anastomosis comprising a staple head and an anvil; means supporting said staple head and said anvil for movement toward and away from each other; said staple head and said anvil each having an ovoid-shaped cross-section and being adapted to simultaneously set a plurality of staples in at least one row forming a closed loop.

4,047,655

LIQUID LEVEL CONTROL MEANS AND METHOD

Gerald P. McCafferty, Churchville, Pa., assignor to The Budd Company, Troy, Mich.

Filed Nov. 28, 1975, Ser. No. 636,285
Int. Cl.[2] B23K 3/06
U.S. Cl. 228—259 3 Claims



3. A method of soldering plurality of workpieces and for switching automatically and repetitively the level of solder in a container comprising the steps of:

sequentially positioning one at a time said workpieces over said solder a predetermined distance therefrom;

placing first control means with an open end into said solder to provide a first enclosed pressure chamber;

applying pressure to said first chamber to force the solder level therein to lower, the solder level in said second chamber to rise and the solder level in said container to rise to contact said workpiece;

detecting the solder level within said second chamber to discontinue the application of additional pressure to said first chamber while maintaining its pressure when the solder level therein reaches the level to apply solder to a particular workpiece disposed over said solder;

maintaining the solder level within said container at its raised level during the soldering of said particular workpiece, and

releasing the pressure within said first chamber after soldering said workpiece for a predetermined time to cause the solder level therein to rise, the level of the solder in said second chamber to lower and the solder level in said

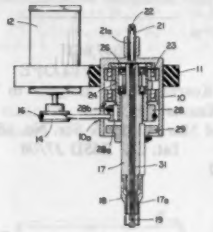
container to lower away from said particular workpiece to discontinue soldering of said particular workpiece.

4,047,656

ORBITAL MOTION WELDING HEAD

Paul W. McCombs, Connersville, Ind., assignor to Mac Machine & Metal Works Inc., Connersville, Ind.

Filed Mar. 3, 1976, Ser. No. 663,239
Int. Cl.² B23K *9/12, 9/28*
U.S. Cl. 228—27 **2 Claims**



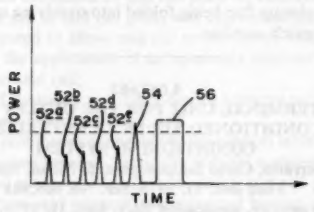
1. A welding head adapted to be moved so as to traverse a work surface to be welded, said head comprising a central support member and a tubular body carried thereby, a cylindrical spindle supported for free axial rotation within said tubular body about an axis parallel to the central longitudinal axis of said tubular body, the central bore of said spindle being offset with relation to the central bore of said tubular body, a tubular welding gun body extending centrally through said spindle bore and supported by said spindle for free axial rotation with relation thereto about an axis parallel to said central longitudinal axis of the tubular body, power means for axially rotating said spindle, and means for restraining said welding gun body against axial rotation with said spindle, whereby the tip of said welding gun body traces a generally circular path defined by the eccentricity of said spindle bore as said spindle is rotated by said power means, said circular path movement being independent of the work surface traversing movement of the welding head.

4,047,657

METHOD AND APPARATUS FOR JOINING METAL WORKPIECES USING HIGH FREQUENCY VIBRATORY ENERGY

Bruce L. Mims, Sherman, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Nov. 1, 1976, Ser. No. 737,526
Int. Cl.² B23K *21/02*
U.S. Cl. 228—103 **16 Claims**



1. The process of welding workpieces having metal surfaces by high frequency vibratory energy comprising:

superposing two workpieces to be welded upon one another;

applying a static force to the workpieces in a direction and of a magnitude to hold the contacting to be welded metal faces of the workpieces in intimate contact at the intended welding zone;

introducing through a vibrating element contacting one of the to be welded workpieces at the weld zone short bursts of vibratory energy having a predetermined frequency in the range from one to one hundred kilohertz;

monitoring the power commensurate with the vibratory energy transferred from the element to the workpieces and determining when a burst reaches a predetermined power amplitude, and

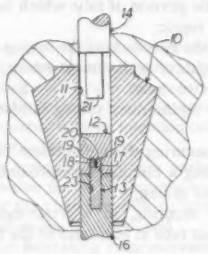
responsive to the occurrence of said power reaching the predetermined amplitude introducing said vibratory energy for a predetermined weld cycle.

4,047,658

METHOD OF FORMING A PRODUCT OF TWO DIFFERENT METALS

Harry D. Frueauff, Jr., P.O. Box 2213, Tallahassee, Fla. 32304

Filed June 10, 1976, Ser. No. 694,839
Int. Cl.² H02R *43/02*; B23K *21/00*
U.S. Cl. 228—115 **8 Claims**



1. The method of forming a product of two different metals in a closed die having a male punch element and a female punch element wherein a first metal member is connected to a second metal member of a smaller size comprising the steps of:

a. providing a recess in one end of said first metal member of a size to receive one end of said second metal member,

b. preplating at least one of said metal members with another metal selected from the group consisting of indium and tin,

c. placing said first metal member and said second metal member in said closed die with said one end of said second metal member projecting into said recess in said first metal member with the other end of said first metal member being adjacent said male punch element and the other end of said second metal member extending into said female punch element, and

d. applying high pressure to the outermost end of at least one of said metal members through at least one of said punch elements to impart relative movement of said metal members toward each other while in said closed die to form a recess in said other end of said first metal member by said male punch element and simultaneously cause flow of the metals together at the point of contact of said metal members with displacement of one metal in the other at said point of contact whereby surface impurities are removed from the interface of the connected portions of said metal members and a metal to metal joint is provided therebetween.

4,047,659

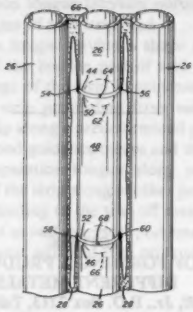
METHOD FOR REPLACING WORN TUBES IN A GAS HOOD

Drago M. Vucic, Lorain, Ohio, assignor to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 646,302, Jan. 2, 1976. This application Oct. 20, 1976, Ser. No. 734,067

Int. Cl.² B23K *28/02*

U.S. Cl. 228—119 **11 Claims**



1. A method of repairing cooling tubes contained within a gas hood for a steelmaking vessel, said method comprising:

cutting out the portion of tube which has been identified as in need of repair;

squaring off the two ends of the tubing between which

cutting a length of replacement tubing to fit the space between the two ends;

inserting the replacement tubing in place between the two ends;

temporarily securing the replacement tubing in place;

radially drilling a circular hole proximate each end of the replacement tubing;

permanently securing, in a water-tight relationship, the replacement tube at each end to the two ends of existing tubing;

placing an equally-sized plug cut from circular tubing into the circular hole cut proximate each end of the replacement tubing; and

sealing the plugs to the holes cut in the tubing to form a water-tight relationship between the two.

4,047,660

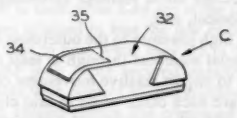
COMPOSITE PACKAGE

Richard L. Bell, Glenmore; John D. Desmond, and Joseph J. Hart, both of Philadelphia, all of Pa., assignors to Container Corporation of America, Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 642,741

Int. Cl.² B65D *5/70, 5/72, 17/24*

U.S. Cl. 206—620 **5 Claims**



1. In a two-piece, composite pagkage, the combination of:

a. a body member formed of foldable paperboard and including a bottom wall and opposed pairs of side and end walls upstanding therefrom to form a boxlike structure open at the top;

b. a cap member including a dispensing opening and a cover for said opening and defining a cover structure open at the bottom;

c. said cap member including a depending skirt portion received within the upper portion of said body member;

d. said body member including flap means foldably connected to an upper edge of at least one of said walls and extending over a portion of said cap member to retain said cap member on said body member;

e. said flap means including a removable tab detachably joined thereto and overlying said cap member dispensing opening.

4,047,661

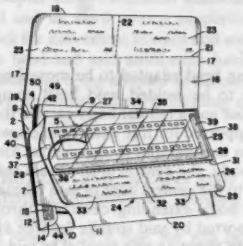
PRINT ENVELOPE

Bernard Klein, Kearney, Mo., assignor to Tension Envelope Corporation, Kansas City, Mo.

Filed Mar. 17, 1976, Ser. No. 667,506

Int. Cl.² B65D *27/08*

U.S. Cl. 229—70 **11 Claims**



1. A multi-pocket envelope comprising:

a. substantially rectangular front and back panels interconnected along side and bottom edges thereof forming a first content receiving pocket, said first pocket having an insert opening between the remaining edges of said panels;

b. a closure flap having a free edge and being connected with said front panel remaining edge along a first fold line;

c. a center flap having side edges and a free edge and being connected with said back panel remaining edge along a second fold line about which the center flap is folded into overlying relation with at least a portion of the back panel;

d. a patch member having upper and lower edges and first and second opposing side edges, a portion of said patch member lower edge and a portion of at least one patch member side edge being connected to said center flap forming a second content receiving pocket, said second pocket having an insert opening along at least the patch member upper edge; and

e. said closure flap being folded into overlying relation with said patch member.

4,047,662

TERMINAL UNIT FOR THE OUTLET OF CONDITIONED AIR IN A CENTRALIZED CONDITIONING SYSTEM

Angelo Serratto, Corso Indipendenza, 5, Milan, Italy

Filed Dec. 11, 1975, Ser. No. 639,981

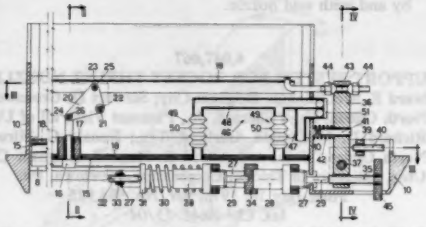
Claims priority, application Italy, Dec. 11, 1974, 30453/74

Int. Cl.² F24F *13/06*

U.S. Cl. 236—49 **13 Claims**

1. A terminal unit for the outlet of conditioned air in a centralized conditioning system, comprising a diffuser of conditioned air through outlet ports connected with a conditioning station and means for controlling conditioned air flow operated by a thermostatic device, wherein said conditioned air flow controlling means is positioned within the diffuser and is

arranged to vary the outlet ports thereof, further comprising a device for conveying conditioned air directly to the thermo-



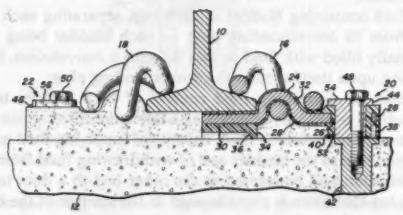
static device and means for actuating the conveyer device at a predetermined pressure of conditioned air.

4,047,663

RAIL PLATE HAVING SPRING CLIPS AND LATERAL POSITIONING MEANS

Clarke Reynolds, 535 Hillary Drive, Tiburon, Calif. 94920, and Richard J. Quigley, 25538 Adobe Lane, Los Altos Hills, Calif. 94022

Filed Nov. 21, 1975, Ser. No. 634,166
Int. Cl.[2] E01B *9/48, 9/62, 9/68*
U.S. Cl. 238—304 **8 Claims**



1. A fastener for supporting a rail on a support structure comprising:

a rail plate having an upper surface for supporting the rail;

clip means connected to said rail plate for resiliently clamping the rail to said rail plate, said clip means being shaped and located to allow said rail to rise above said rail plate under the application of an upwardly directed force applied to said rail;

a layer of elastomer material mounted between said rail plate and the support structure; and

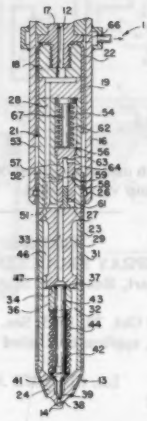
a pair of post means connected to the support structure, each post means being in vertically slidable engagement with said rail plate for laterally restraining said rail plate with respect to said support structure, and having a collar in nonclamping vertical engagement with said rail plate for allowing said rail plate to freely float upon said first layer of elastomer material in the uncompressed state when said rail plate is unloaded and defines a no-load level and for precluding said rail plate from rising above said no-load level while permitting the rail plate to move downwardly under the application of a downwardly directed force applied to said rail.

4,047,664

ACCUMULATOR TYPE INJECTION VALVE INCLUDING A DUMP VALVE FOR FAST RESPONSE

Stanley J. Kranc, Morton; Alan W. Wells, Edelstein, and David E. Hackett, Washington, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 22, 1976, Ser. No. 669,363
Int. Cl.[2] B05B *1/28*
U.S. Cl. 239—120 **8 Claims**



1. An accumulator type fuel injection valve comprising

a cylindrical body forming an elongated chamber,

an inwardly opening outlet valve means arranged at one end of the chamber for selectively and intermittently communicating the chamber with an injection orifice in response to fluid pressure in the chamber,

inlet valve means arranged in another portion of the chamber, the inlet valve means selectively and intermittently communicating the chamber with an inlet passage while the outlet valve means is closed, and

a dump valve for increasing responsiveness of the outlet valve means, the dump valve including a dump valve means communicating the chamber with a drain and an interacting spring means, the dump valve means tending toward a closed condition in response to fluid pressure in the chamber, the dump valve means tending to be opened by the spring means, and the spring means having a resilience selected to open the dump valve means when pressure in the chamber drops below a predetermined level.

4,047,665

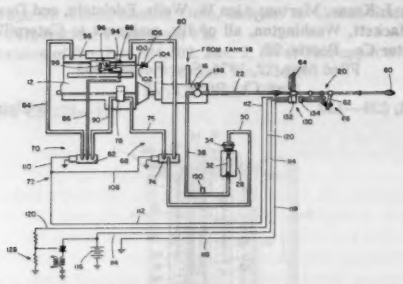
SPRAY CONTROL SYSTEM

William N. Moynihan, 9646 S. Springfield, Evergreen Park, Ill. 60642

Filed Nov. 14, 1975, Ser. No. 631,822
Int. Cl.[2] B05B *9/00*; F04B *49/02*
U.S. Cl. 239—124 **10 Claims**

1. In a high pressure, liquid spraying system including an internal combustion engine, a pump driven by the engine, a source of liquid connected to the pump and a spray nozzle assembly connected by a high pressure conduit to the output of the pump, the improvement comprising spray control means for controlling the pressure of liquid in and the flow of liquid to the spray nozzle assembly, for causing dumping of unneeded pressurized liquid at a location adjacent the pump and for cushioning the discharge of dumped liquid, said control means being electrically operated and including dump valve means adjacent the pump for dumping pressurized liquid, an enclosure surrounding said dump valve means and having openings therethrough, said enclosure serving to cushion the dumping of pressurized liquid from said dump valve means and said

openings permitting easy flow of dumped liquid from said enclosure into the ambient environment, and hand manipulatable electric switch means mounted on the nozzle assembly for operating said dump valve means.

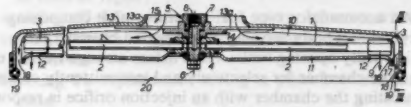


4,047,666

JET OR SPRAY PRODUCING APPARATUS

Bernard Eaton Hart, Rosebank, Stoford, Salisbury, Wiltshire, England

Filed Oct. 20, 1975, Ser. No. 624,063
Claims priority, application United Kingdom, June 18, 1975, 26034/75
Int. Cl.² B05B *3/06*
U.S. Cl. 239—251 **14 Claims**



1. Apparatus for producing a rotating jet surface-treating fluid to be directed against a surface perpendicular to the axis of rotation of the jet, said apparatus comprising:

a nozzle directed along a first axis and adapted to produce a jet of surface-treating fluid along said axis;

means for connecting said nozzle to a supply of surface-treating fluid under pressure;

means mounting said nozzle for rotation about a second axis spaced from said nozzle axis, said second axis being perpendicular to the surface and said nozzle axis being inclined to said second axis so that fluid leaving said nozzle will exert a force on said nozzle which will rotate said nozzle about said second axis;

casing means defining a chamber generally coaxial with said second axis and in which said nozzle will rotate, said casing means defining an opening through which said rotating jet from said nozzle will emerge and comprising first and second cover members extending radially of said second axis and axially delimiting said chamber, said second cover member being positioned between said surface and said first cover member when said jet is directed against said surface, and a peripheral member peripherally delimiting said chamber;

skirt means extending axially from said casing means to peripherally enclose a space into which said jet will emerge from said opening, said space being axially delimited by said second cover member and said surface;

said casing means defining axial aperture means in the region of said second axis and peripheral aperture means in the region of said periphery of said chamber, one of said aperture means communicating with said space and the other of said aperture means communicating with the exterior of said apparatus;

rotary fluid impeiler means in said chamber for driving a pressure-changing fluid through said chamber from said axial aperture means to said peripheral aperture means for changing the pressure in said space relative to the pressure on the exterior of said apparatus; and

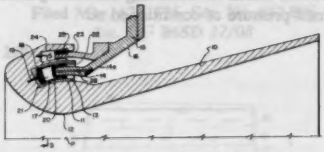
means mounting said rotary fluid impeller means for rotation by and with said nozzle.

4,047,667

SUPPORT SYSTEM FOR ROCKET THRUST NOZZLES

Edward E. McCullough, Brigham City; Stewart H. Greenwood, North Ogden; Hoyt Sherard, Jr., Pleasant View, all of Utah; Richard D. McDonald, Garland, Tex.; Ronald G. Hirschi, North Ogden, Utah, and Alfred R. Randall, Brigham City, Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed July 10, 1975, Ser. No. 594,925
Int. Cl.² B64C *15/04*
U.S. Cl. 239—265.35 **1 Claim**



1. In a rocket having a case with an aft aperture therein and a movable thrust nozzle in the aperture, a system for mounting the thrust nozzle to the rocket case comprising:

a plurality of cups surrounding the nozzle and fixed to one of said members (i.e. the nozzle and case) in a common plane perpendicular to the axis thereof;

a plurality of plugs fixed to the other said member, so that each plug fits loosely into a corresponding one of the cups, the plugs and cups being arranged so that they tend to be forced together by pressure of propulsive gases of the rocket;

a fluid containing bladder in each cup, separating each cup from its corresponding plug — each bladder being partially filled with fluid so that it forms a convolution, folding upon itself around the corresponding plug;

means for permitting fluid content of each bladder to be varied in quantity comprising a tube connected at one to a source of hydraulic fluid, capable of supplying fluid under pressure to the bladder and of withdrawing fluid from the bladder, and connected at the other end to a duct in the plug that extends therethrough to the interior of the bladder; and

means for providing a gastight seal between the nozzle and the rocket case.

4,047,668

WATER HYDRANT DIFFUSER

Harry R. DeWeese, 1785 Genevieve, San Bernardino, Calif. 92405, and Gary L. Smith, 357 Terrace, San Bernardino, Calif. 92410

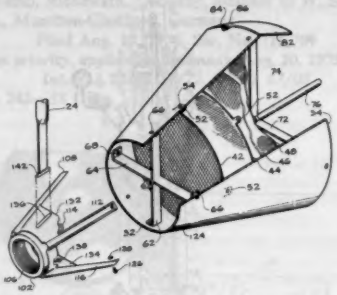
Filed Mar. 2, 1976, Ser. No. 663,057
Int. Cl.² G01F *1/36*; B05B *1/26*
U.S. Cl. 239—500 **4 Claims**

1. A water hydrant diffuser comprising:

a plurality of diffuser elements mounted in an enclosed housing in generally parallel planes;

a coupling section having a free end and a mating end, said free end having threaded female coupling means for securing said coupling section to a water hydrant outlet and said mating end being secured to one end of said housing, said housing being formed of a truncated cone having a small diameter base and an enlarged diameter base with said small diameter base being connected to said coupling section, said enlarged diameter base end containing a handle for carrying said diffuser, said handle being se-

cured to a pair of housing shape retention cross bars secured to said truncated cone; and



aperture means for inserting a fluid flow measuring device in said diffuser intermediate said coupling member free end and said diffuser elements.

4,047,669

GAS NOZZLES FOR GAS USING APPLIANCES

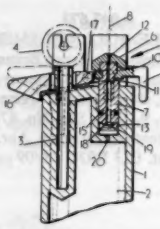
Ferenc Gutai, Shipping Campden, England, assignor to Dynacast International Limited, Alcester, England

Filed May 12, 1976, Ser. No. 685,494

Claims priority, application United Kingdom, May 15, 1975, 20535/75

Int. Cl.² F23Q *1/02*

U.S. Cl. 239—540 **6 Claims**



1. A gas-using appliance comprising a gas container having an exterior tubular socket, the bottom of which is connected by a passage to the interior of the gas container and the top of which is open and a gas nozzle device, said gas nozzle device comprising an elongated piston member slidable in the tubular socket having one end projecting from the top of the socket and presenting a surface of contact, a cap member mounted on the projecting end of the piston member and presenting a surface of contact abutting against the surface of contact presented by the piston member, said cap and piston members being relatively rotatable and each having a passage one end of which is located in the surface of contact of the respective member and the other end of which is located at the other end of the respective member, the ends of the two passages on the respective surface of contact being eccentric with respect to the axis of relative rotation of the members by amounts such that the locus of at least one point on the periphery of the end of the passage in one member in different relative angular positions of the two members is an orbit, a portion of said orbit being within the periphery of the end of the passage in the other member, seal means located at the bottom of the socket, means for rotating the cap member and the piston member relatively to one another and means for reciprocating the piston member in the socket into and out of contact with the sealing means whereby to close and open said other end of the passage in the piston member.

4,047,670

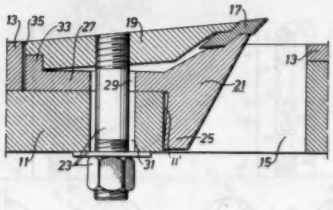
KNIFE DEVICE FOR A CHOPPER

Nils David Svensson, Hammaro, Sweden, assignor to Aktiebolaget Iggesunds Bruk, Sweden

Continuation of Ser. No. 561,507, March 24, 1975, abandoned. This application May 26, 1976, Ser. No. 690,230

Int. Cl.² B02C *18/18*

U.S. Cl. 241—92 **4 Claims**



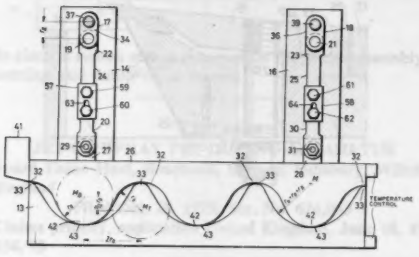
1. An apparatus for chopping material comprising a rotatable chopper disk having at least one radially disposed opening extending therethrough, a first knife holding means mounted on said disk and having a chip guiding surface located within said radial opening, said first knife holding means having a first knife engaging portion including at least two angularly disposed knife engaging surfaces, a second knife holding means mounted on said first knife holding means and having an outer wall disposed generally along the radial face of said disk, said second knife holding means having a second knife engaging portion including at least two angularly disposed knife engaging surfaces, a knife mounted between said first and second knife holding means adjacent said opening, said knife having at least one cutting edge disposed outwardly from a radial face of said disk and defined by the intersection of first and second knife edge surfaces, said knife having first and second contact surfaces, each of said contact surfaces having first and second angularly disposed surface portions for cooperative engagement with said first and second knife engaging surfaces of said first and second knife holding means, respectively, said first angularly disposed surface portion of said first contact surface extending outwardly beyond said chip guiding surface of said first knife holding means and intersecting said first knife edge surface so that the plane of said first knife edge surface is located outwardly of the plane of said chip guiding surface, said first angularly disposed surface portion of said second contact surface extending outwardly beyond said outer wall of said second knife holding means and intersecting said second knife edge surface so that the plane of said second knife edge surface is located outwardly of the plane of said outer wall of said second knife holding means, and means for securing said knife between said first and second knife holding means, whereby the location of said first and second knife edge surfaces relative to the planes of said chip guiding surface of said first knife holding means and said outer wall of said second knife holding means, respectively, substantially prevents material from penetrating between said knife and said first and second knife holding means.

4,047,671

CONTINUOUSLY OPERABLE APPARATUS FOR THE PREPARATION AND/OR PROCESSING OF SYNTHETIC PLASTICS OR RUBBER MOULDING COMPOUNDS

Jurgen Bertram, Celle; Wilhelm Brand, Hannover, and Hans-Joachim Schaeffer, Latzen, all of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany

Filed June 1, 1976, Ser. No. 691,582
Claims priority, application Germany, May 30, 1975, 2523932; Mar. 25, 1976, 2612610; Mar. 25, 1976, 2612611; Mar. 25, 1976, 2612612
Int. Cl.[2] B02C *11/08*
U.S. Cl. 241—66 22 Claims



1. In continuously operable apparatus for the processing of powdered moulding compounds, the improvement comprising a housing in the form of a channel and a mixing and kneading member engaged in the channel and having a surface which co-operates with the bottom wall of the channel, in which said bottom wall and said surface of the mixing and kneading member are undulatingly profiled in a manner such that the profiles extend transversely or obliquely with respect to the longitudinal axis of said channel and said member, and drive means, including at least one crank drive, coupled between the housing and said member to cause said member and said housing, while retaining their respective orientations to move relatively to one another to cause the peaks of the undulations on one of the profiled surface and the profiled bottom wall to perform a circular movement in associated valleys in the other of the profiled surface and the profiled bottom wall, whereby the moulding compounds are sheared in said valleys and longitudinally conveyed from valley to valley to a discharge end of the apparatus.

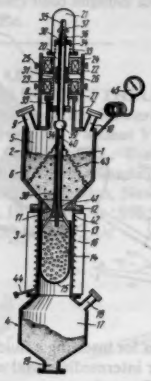
4,047,672

APPARATUS FOR DISINTEGRATION OF MATERIALS

Vladimir Vladimirovich Volkov, ulitsa Zolotodlinskaya, 34, kv. 2; Gennady Ivanovich Bagryantsev, ulitsa Zhemchuzhnaya, 12, kv. 24; Igor Grigorievich Larionov, morskoi prospekt, 21, kv. 15; Alexandr Filippovich Neermolov, Vesenny proezd, 6, kv. 45, and Valery Georgievich Leontievsky, Tsvetnoi proezd, 19, kv. 36, all of Novosibirsk, U.S.S.R.

Continuation of Ser. No. 585,515, June 10, 1975, abandoned.
This application Sept. 23, 1976, Ser. No. 725,925
Int. Cl.[2] B02C *17/14*
U.S. Cl. 241—175 5 Claims

1. An apparatus for disintegration of solid materials, comprising: an airtight shell with three intercommunicating compartments, of which the top one serves as a material charging chamber and has an inlet pipe for material to be charged, the middle compartment accommodates a chamber with grinding solids, while the bottom compartment serves as a chamber for discharge of disintegrated products; a vibrator mounted on the shell and provided with a rod inserted into the material charging chamber so that the rod is mechanically disengaged from



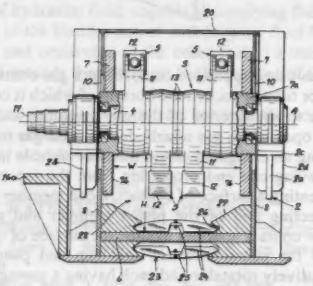
the shell and is rigidly connected to the grinding-solid chamber to impart oscillating motion to the grinding-solid chamber.

4,047,673

SINGLE-ROLL CRUSHER

Herbert Aulmann, Mullenbach; Ernst Braun, and Gert Braun, both of Essen-Heisingen, all of Germany, assignors to Aulmann & Beckschulte, Bergneustadt, Germany

Filed Apr. 9, 1976, Ser. No. 675,502
Claims priority, application Germany, Apr. 12, 1975, 2516146
Int. Cl.[2] B02C *13/09*
U.S. Cl. 241—186 R 10 Claims



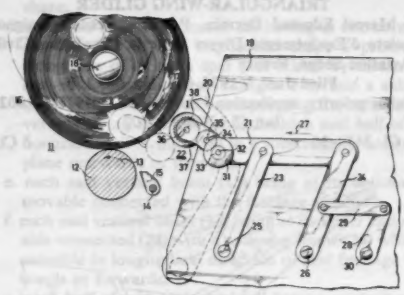
1. A single-roll crusher, especially for coal and similar minerals, comprising a housing, a bifurcated support pivotally mounted on said housing, a crusher roll journaled on said support and provided with a plurality of hammers, an anvil plate disposed below said crusher roll and cooperating with said hammers to comminute mineral pieces passing through a throad between said roll and said anvil plate, and a pair of rotating disks mounted on the extremities of said roll and flanking said hammers, said roll having a shaft journaled on said support and forming the axis for said disks, said disks resisting upward forces on said roll and imparting thereto a moment of inertia positionally stabilizing same.

4,047,674

DEVICE FOR ADJUSTING A RETROGRADE ROTARY MOTION IN A COIL

Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Aug. 19, 1976, Ser. No. 715,709
Claims priority, application Germany, Aug. 20, 1975, 2536991
Int. Cl.[2] B65H *54/22, 54/40, 67/08*
U.S. Cl. 242—18 DD 6 Claims



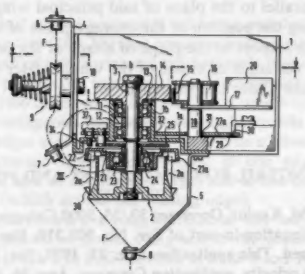
1. In winding equipment for textile coils, a device for effecting retrograde rotary motion in a coil being frictionally driven at a given rotary speed by a winding cylinder, comprising reduction gearing, and means for inserting said reduction gearing between the winding cylinder and the coil whereby both the rotary direction of the coil is reversed and the rotary speed thereof in the reverse direction is reduced.

4,047,675

THREAD STORING AND FEEDING DEVICE

Kurt Arne Gunnar Jacobsson, Ulricehamn, Sweden, assignor to Aktiebolaget IRO, Ulricehamn, Sweden

Filed Feb. 3, 1976, Ser. No. 654,954
Claims priority, application Germany, Feb. 4, 1975, 2504635
Int. Cl.[2] B65H *51/20*
U.S. Cl. 242—47.01 17 Claims



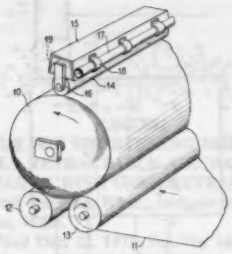
1. In a thread storing and feeding device, particularly for feeding thread in a sewing machine, comprising a housing, a storage drum mounted thereon, to which drum the thread can be tangentially fed to form a thread supply thereon and from which the thread can be withdrawn overend, a sliding disc movable in the axial direction of the storage drum for moving the thread supply over the drum, and a switching device which can be actuated by the axial movement of the sliding disc for controlling a winding drive which causes thread to be wound on the drum, the improvement wherein the sliding disc is supported on a pivot lever, of which the end directed away from the sliding disc is tiltably supported on the housing by a pivot which is located at a distance from the storage drum axle at least approximately equal to the drum radius so that the sliding disk is movable approximately rectilinearly in the axial direction with respect to the drum.

4,047,676

WINDER VIBRATION DAMPENER

Carl B. Dahl, Rockton, Ill., and Jere W. Crouse, Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Dec. 17, 1974, Ser. No. 533,480
Int. Cl.[2] B65H *17/12*
U.S. Cl. 242—66 5 Claims



1. A winder for winding a continuous traveling web on a core, comprising in combination:

supporting roll means for supporting a rotating roll being wound; a supporting beam having bearings,

an elongate rider roll rotatably mounted on said supporting beam in said bearings above the roll being wound and in rotational contact with the roll;

a vibration absorber secured to said supporting beam and extending parallel to the roll and absorbing energy along the length of the roll generated by radial bouncing movements of the wound roll transmitted to the rider roll and to the supporting beam through said bearings supporting the rider roll on the supporting beam;

said vibration absorber having an axially extending hollow outer cylinder secured to the supporting beam an inner beam member floatingly carried within said outer cylinder;

an inflatable tube surrounding the inner beam member and located between the cylinder and inner beam member;

and an inflation means for controllably inflating the tube against the interior of said outer cylinder.

4,047,677

TRANSMIT AND RECEIVE TERMINAL FOR SINGLE TUBE PNEUMATIC CARRIER SYSTEM

Ernest Hochradel, 61 Edison Terrace, Sparta, N.J. 07871, and Werner Hauer, 381 Passaic Ave., Nutley, N.J. 07110

Filed Sept. 13, 1976, Ser. No. 722,497
Int. Cl.[2] B65G *51/32*
U.S. Cl. 243—19 13 Claims

8. A terminal for a pneumatic tube system connectable to a carrier-conveying tube through which carriers move in opposite direction in transit to and from the terminal, comprising:

a send hopper into which multiple carriers can be inserted for temporary storage prior to sequential transmission from said terminal via said carrier-conveying tube, said carriers being released in a vertical disposition from said send hopper through a carrier exit in a vertically downward direction under the force of gravity,

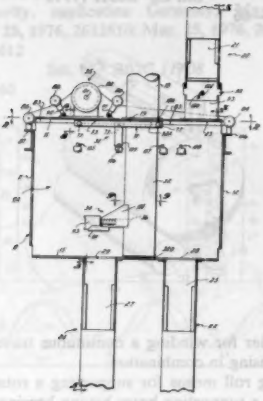
a vertically disposed transfer tube open at its upper and lower ends for receiving and temporarily storing a carrier, said transfer tube having a selectively releasable detent for supporting a carrier in said transfer tube,

a first received-carrier hopper for temporarily storing a plurality of received carriers sequentially transmitted to said terminal via said carrier-conveying tube, said first received-carrier hopper receiving and storing vertically

disposed carriers which are delivered to an entrance end thereof in a vertically downward direction,

a transfer tube mount and drive assembly for reciprocating said transfer tube in a horizontal path between

a. a first position in which said upper end of said transfer tube underlies said exit of said send hopper to receive in said transfer tube for support by said detent a downwardly moving carrier released from said send hopper,



b. a second position in which said transfer tube is aligned with said carrier-conveying tube for delivery of a carrier to said carrier-conveying tube for transmission from said terminal, and for receiving a carrier from said carrier-conveying tube transmitted to said terminal, and

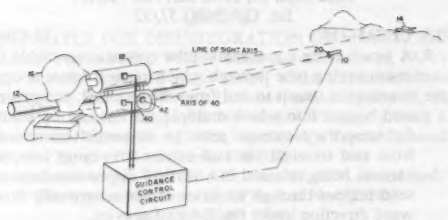
c. a third position in which said lower end of said transfer tube overlies said entrance end of said first received-carrier hopper for downward gravity-induced delivery of a received carrier thereto upon release of said transfer tube detent.

4,047,678

MODULATED, DUAL FREQUENCY, OPTICAL TRACKING LINK FOR A COMMAND GUIDANCE MISSILE SYSTEM

Walter E. Miller, Jr.; Jimmy R. Duke, and Robert L. Sitton, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 7, 1969, Ser. No. 870,554
Int. Cl.² F41G 7/00
U.S. Cl. 244—3.16 **9 Claims**



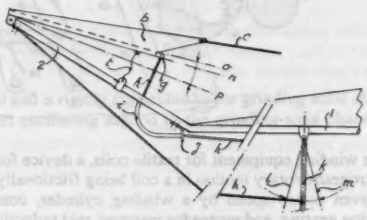
1. A dual frequency, optical tracking link within a missile tracking system, comprising: a photoemissive beacon within a missile housing to be tracked for transmitting an optical coded signal; said beacon including square wave generating means for producing a plurality of distinct and separate electrical square wave output frequencies, light emitting means, and coupling means for connecting said square wave frequencies to said light emitting means; optically sensitive tracking means, including photosensitive detectors responsive to said coded signal for providing an electrical signal output indicative of said coded signal, a preamplifier responsive to said detector for amplifying said electrical signal output, and means for reducing said plurality of frequencies for providing attitude control signals to said missile.

4,047,679

TRIANGULAR-WING GLIDER

Paul Marcel Edmond Decroix, Puteaux, France, assignor to Societe d'Equipements Divers Pour la Population Civile et l'Aviation Sedpa, France

Filed Jan. 7, 1976, Ser. No. 647,160
Claims priority, application France, Jan. 7, 1975, 75.00290
Int. Cl.² B64C 31/02
U.S. Cl. 244—16 **3 Claims**



1. Light triangular wing glider having a center of gravity and a vertical longitudinal middle plane, said glider comprising a principal wing having a frame and being in the form of a forward pointing triangle, a pilot's suspension harness under said principal wing, an auxiliary flexible wing positioned in front of said principal wing; said auxiliary flexible wing consisting essentially of a piece of cloth-like material essentially symmetrical with respect to said vertical longitudinal middle plane, a central rigid rod fastened to said piece of cloth-like material along its line of symmetry, and guys secured to side edges of said piece of cloth-like material for tensioning the cloth-like material, said glider including further means for maintaining said auxiliary wing in an average plane approximately parallel to the plane of said principal wing; and means for varying the position of the average plane of said auxiliary wing with respect to the plane of attack of the principal wing whereby the angle of attack of the whole glider can be modified and the glider can be pulled out of a dive.

4,047,680

SWINGTAIL FOR SPACECRAFT AND FOR FAST AIRCRAFT

Herbert M. Kaniut, Orrerweg 33/35, 5000 Cologne 71, Germany

Continuation-in-part of Ser. No. 508,319, Dec. 4, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 643,611
Claims priority, application Germany, Aug. 16, 1974, 2439479
Int. Cl.² B64C 5/10
U.S. Cl. 244—87 **11 Claims**

1. In aircraft being capable for repeated space missions as space shuttles and for supersonic flights in the atmosphere (FIG. 8; FIG. 9 and FIG. 10), and having increased safety landing capabilities with improved manoeuvrability at low flight speeds the improvement comprising:

a fuselage (1) with fixed vertical tail(s) (9) positioned on its aft end,

a pair of wings (2) swept outwardly and rearwardly with respect to the sides of said fuselage equiped with ailerons (16) and landing flaps (18*a*; 18*b*),

propulsion means mounted on said aircraft,

a horizontal tail (10*a*; 10*b*) consisting of two halves and having a variable geometry with swinging movements

(48) of said tail halves in outside arcs rearward and forward again,

a. the said horizontal tail halves being swung to a forward position (10*a*) for high-speed flight and particularly for the entering operation into the atmosphere and for the supersonic flight in the atmosphere,

b. the said horizontal tail halves being swung to a rearward position (10*b*) for low-speed flight and particularly for the landing or takeoff operation,

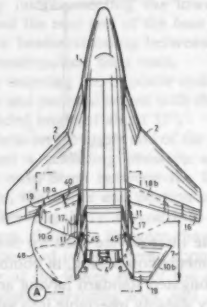
c. each half of said horizontal tail having a trapezoidal shape,

d. each half of said horizontal tail having at one corner of the base-line of said trapezoidal shape a protruding elongation of its main spar (12) which by means of a curved connection piece changes over into a substantially vertical beam (13) incorporating the substantially vertical swing axis (45) around which said half of said horizontal tail swings (48) in a substantially horizontal plane rearwards or forwards,

e. each said vertical beam (13) being at its bottom end movable connected with the fuselage structure,

f. each said vertical beam (13) being at its upper end movable connected (22) with a retaining frame (24) which is movable in longitudinal direction of said fuselage rearwards or forwards,

g. each half of said horizontal tail having control means for said rearward and forward swing movements



h. each half of said horizontal tail being coupled said said landing flap (18*a*; 18*b*) for common control movements,

i. each half of said horizontal tail having in two cross-sections positioned substantially perpendicular to each other two different air foil profiles of which one profile is advantageous for supersonic flight speeds being at both edges sharp and the second profile is advantageous for subsonic flight speeds being at one edge round (which acts as the leading edge) and at the other edge sharp (which acts as the trailing edge),

j. the said forward swung horizontal tail halves (10*a*) being placed in planes lying above the planes of said wings (FIG. 1 to FIG. 3; FIG. 4; FIG. 7 to FIG. 9) and being so much moved forward that the leading edges of said horizontal tail halves are positioned in front of the trailing edges of said wings (40) whereby the sharp leading edges of said horizontal tail halves are heat protected by the wing planes during the entering operation of said spacecraft into the atmosphere, and whereby the supersonic impact wave resistance of the swept wings and horizontal tail halves is reduced during the supersonic flight in the atmosphere,

k. the said forward swung horizontal tail halves (10*a*) having negative profile cambers and negatively inclined chords (32) (FIG. 7) with respect to the chords of said wings (FIG. 2; FIG. 7 and FIG. 9),

l. the said horizontal tail halves getting continuously increasing positive angles of incidence in relation to the local streamline direction during said rearward swing movements to produce additional lift during low-speed flight, which positive angles of incidence are continuously turned back during said forward swing movements of said horizontal tail halves,

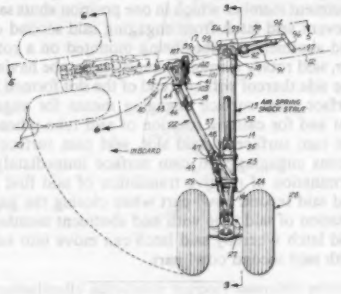
m. the said fuselage (1) carrying adaptor fairings (11) on both rear side walls adjacent to the two said horizontal tail halves.

4,047,681

APPARATUS FOR SHORTENING THE STRUT OF A PIVOTALLY RETRACTABLE AIRCRAFT LANDING GEAR DURING GEAR RETRACTION

Erwin H. Hartel, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 22, 1975, Ser. No. 643,030
Int. Cl.[2] B64C *25/12*
U.S. Cl. 244—102 SS **7 Claims**



1. A retractable aircraft landing gear assembly comprising:

a short strut including telescopically coacting first and second members, said strut having one end pivotally mounted to a strut support on an aircraft for rotative retraction of the strut between a generally downwardly extending ground support position, and an out-of-the-way retracted position;

rotatable means mounted for rotation on said first member about an axis of rotation generally parallel to the longitudinal dimension of said strut and at a location spaced from the pivotally mounted end of said strut;

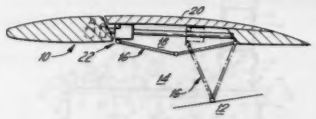
an elongate, collapsible brace means having opposed ends separately, pivotally connected to said rotatable means and to a brace support on such aircraft, respectively, said brace means coacting with said strut to assume an uncollapsed strut bracing configuration when said strut is in said downwardly extending position and to assume a collapsed nonbracing configuration when said strut has been moved to its retracted position, said brace support being located to one side of the plane of rotation of said strut so that said brace means has a skewed orientation with respect to said plane of rotation and so that when said strut is moved from said downwardly extending position to said retracted position said brace means effects rotation of said rotatable means; and

linkage means connected between said rotatable means and said second member for mechanically converting said rotation of said rotatable means into inward telescoping of said members to shorten said strut during its retraction.

4,047,682
FAN COWL TRANSLATION LOCK

Frank Denison Brownhill, Chaddesden, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Oct. 13, 1976, Ser. No. 732,072
Claims priority, application United Kingdom, Oct. 28, 1975, 44400/75
Int. Cl.² B64C 15/06
U.S. Cl. 244—110 B 5 Claims

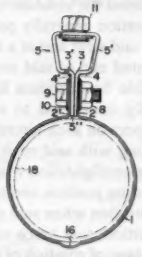


1. A gas turbine engine cowl structure comprising:
a first cowl part;
a second cowl part, said second cowl part being translatable axially of and relative to said first cowl part to open or close a gap;
a latch operable to engage said second cowl part to prevent relative translation of said first cowl part and said second cowl part to open the gap; and
latch operation delaying means comprising a movable latch abutment member which in one position abuts said latch to prevent said latch from engaging said second cowl part, said abutment member being mounted on a rotary member, said rotary member comprising a tube having a slot in one side thereof with one end of the slot formed into a cam surface, cam surface engaging means for engaging said slot and for causing rotation of said tube when engaging the cam surface of said slot, said cam surface engaging means engaging said cam surface immediately prior to termination of relative translation of said first cowl part and said second cowl part when closing the gap to cause rotation of said tube with said abutment member clearing said latch whereby said latch can move into engagement with said second cowl part.

4,047,683
PIPE HANGER

Kazuaki Takeuchi, Hita, Japan, assignor to Chuo Hatsujo Kogyo Co., Ltd., Hita, Japan

Filed Apr. 22, 1976, Ser. No. 679,291
Claims priority, application Japan, Sept. 30, 1975, 50-134617[U]
Int. Cl.² E21F 17/02
U.S. Cl. 248—62 7 Claims

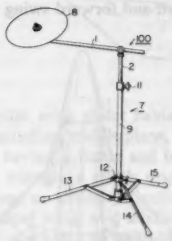


1. A pipe hanger comprising a pipe holder made from a strip of sheet material formed into a loop, said strip having two end portions forming lugs extending generally radially relative to said loop, said lugs having terminating end sections forming hooks, a fitting means from which said pipe holder is suspended, said fitting means having a mounting portion formed as a closed loop element adapted to be rotatably secured to a ceiling and an inserting portion inserted into the space between said lugs, said inserting portion being in the form of projections extending generally radially from said loop element, said fitting means having apertures in which said hooks are accommodated, said pipe holder being initially temporarily mounted on said fitting means by engagement of said hooks in said apertures, and fastening means for securing said pipe holder to said fitting means, whereby said pipe holder is initially temporarily secured to said fitting means by engagement of said hooks in said apertures and subsequently completely secured by said fastening means.

4,047,684
ADJUSTABLE TILTER DEVICE USED FOR HOLDING OBJECTS SUCH AS MUSICAL INSTRUMENTS

Haruhiko Kobayashi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed June 3, 1976, Ser. No. 692,490
Claims priority, application Japan, June 13, 1975, 50-80386[U]
Int. Cl.² B61L 25/00; F16C 11/06
U.S. Cl. 248—122 7 Claims



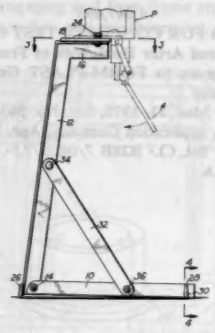
1. Adjustable tilter device used for holding objects such as musical instruments comprising, in combination:
a hollow elongated standard having an open upper end;
a stem freely slidably insertable into said standard from said open upper end;
a stationary tilter block coupled to the upper end of said standard and having a third through hole formed therein;
a movable tilter block having a first through hole for receiving said stem and formed in axial alignment with said hollow elongated standard in such an arrangement that said stem is insertable into said standard through said first through hole;
means for establishing a separable meshing engagement between said two blocks and including first serrations formed on the matching surface of said stationary tilter block and second serrations formed on the matching surface of said movable tilter block for making meshing engagement with said first serrations;
a first cylindrical extension formed on said matching surface of said movable tilter block and accommodated snugly within said third through hole in said stationary tilter block and having a fourth through hole opening in the free end thereof;
a set screw into said fourth threaded hole formed in said cylindrical extension from the side of said stationary tilter block;
means for detachably securing said stem to said movable tilter block; and
thereby, when said establishing means is rendered ineffective, said movable tilter block is swingable about a given center axis relative to said stationary tilter block in order to enable adjustment of the tilting direction of said stem with respect to said standard.

4,047,685

PORTABLE STAND FOR RELOADING PRESSES

Gilbert L. Wika, 333 Cedar Lane, Longview, Wash. 98632

Filed July 9, 1976, Ser. No. 703,754
Int. Cl.[2] A47G *29/00*
U.S. Cl. 248—158 3 Claims



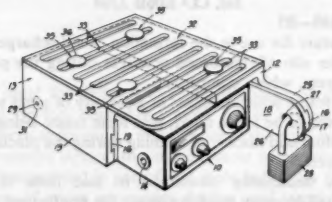
1. A stand for supporting a reloading press, comprising:
a. an elongated base beam having front and rear ends,
b. an elongated pedestal beam,
c. a bolt pivotally interconnecting the lower end of the pedestal beam and the rear end of the base beam,
d. a diagonal brace beam extending between the base and pedestal beams intermediate their ends,
e. bolts removably securing the opposite ends of the brace beam to the base and pedestal beams with the latter beams forming an included angle of about 83°,
f. a mounting platform on the upper end of the pedestal beam adapted to mount a reloading press on a vertical axis intercepting the base beam between the front and rear ends of the latter, the upper end portion of the pedestal beam being offset angularly forward to support said mounting platform, the angle between the pedestal beam and its offset upper end portion being about 97°,
g. a transverse bar at the lower end of the pedestal beam forming a rear lateral stabilizing foot, and
h. a transverse bar at the front end of the base beam forming a front lateral stabilizing foot, the base beam being provided with a notch in its lower edge adjacent its front end and the transverse front foot bar being provided with a notch in its upper edge at its longitudinal center, said notches being dimensioned to interfit the foot bar and base beam at right angles.

4,047,686

MOUNTING BRACKET FOR RADIOS IN VEHICLES

David Edward Porter, 2342 Nesbitt Drive NE., Atlanta, Ga. 30319

Filed Jan. 3, 1977, Ser. No. 756,091
Int. Cl.[2] A47B *96/06*
U.S. Cl. 248—203 7 Claims



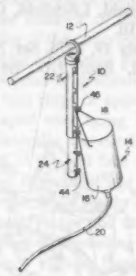
1. An anti-theft mounting for radios in vehicles comprising a top mounting plate, a pair of spaced opposing angle brackets underlying said mounting plate and having depending side webs, adjustable fastener means securing said angle brackets to said mounting plate for lateral adjustment toward and away from each other and adapted to secure the mounting plate to the bottom of an instrument panel in a vehicle, a pair of bar members adapted for securement to opposite sides of a radio and having interlocking projections on their outer sides, said depending side webs having coacting interlocking recesses receiving said projections, concealed locking means for said bar members on said angle brackets preventing fore and aft displacement of the bar members relative to the angle brackets, said interlocking projections and recesses preventing vertical displacement of the bar members relative to said angle brackets, and forward lockable extensions on one angle bracket and bar member adapted for engagement with a primary locking means.

4,047,687

VERTICALLY ADJUSTABLE SUPPORT

Kathleen Harding Turner, 930 Delaine, Corpus Christi, Tex. 78411

Filed June 7, 1976, Ser. No. 693,891
Int. Cl.[2] A61G *12/00*; A47B *73/00*
U.S. Cl. 248—318 9 Claims



1. A longitudinally adjustable support assembly providing a plurality of support positions for a supported article, comprising
first and second elongate longitudinally adjustable members;
means on the second member for suspending the same from a support;
means for latching the first and second members together in a plurality of positions including
a plurality of longitudinally spaced pins on the first member,
a plurality of longitudinally spaced J-slots provided on the second member for supporting the pin and the first member, and
means allowing movement of the pin between the plurality of J-slot; and
means for supporting an article from the assembly comprising the plurality of pins.

4,047,688

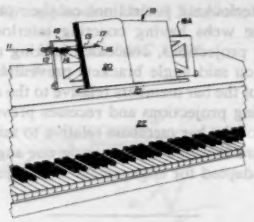
PAGE KEEPER

Betty C. Knox, 4915 E. Mtn. View Drive, San Diego, Calif. 92116, and Sally W. Schneider, 10047 Diversion Drive, Spring Valley, Calif. 92077

Filed Jan. 12, 1976, Ser. No. 648,126
Int. Cl.[2] A47B *97/04*
U.S. Cl. 248—451 2 Claims

1. A device for restraining pages of bound material placed on a reading aid comprising, a spring clip for attachment to said reading aid, a spring wire fixedly attached to said clip and having a first portion extending outwardly at a right angle therefrom to at least one coil of said wire for biasing said wire toward said reading aid, a second portion extending from said at least one coil so as to project over a part of said reading aid

to a substantially right-angled curve and a third portion extending laterally from said terminus of said second portion toward said reading aid, said third portion terminating in a



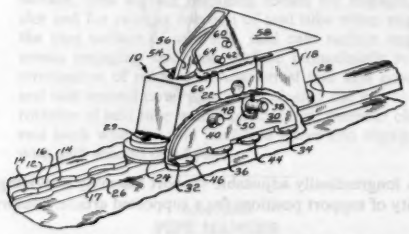
sphere, said clip comprising a pair of jaws which are pivotally coupled together, said first portion of said wire being attached to one of said jaws in the area of said coupling, the interior surfaces of said jaws having non-abrasive coatings.

4,047,689

LOAD DISTRIBUTING TRACK FITTING

Bernard Elden Grendahl, Litchfield, Conn., assignor to UOP Inc., Des Plaines, Ill.

Filed July 19, 1976, Ser. No. 706,641
Int. Cl.[2] B60N *1/00*; B61D *45/00*
U.S. Cl. 248—503.1 **7 Claims**



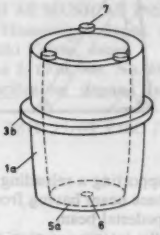
1. A track fitting for use with a slotted floor track of the type used in aircraft wherein said track has a bottom portion, vertical side portions, and top portions carried by each of said side portions and defining the side edges of a longitudinal slot which overlies the bottom and is spaced therefrom, so as to define an open channel, said top portions on each side of said slot being formed so as to define a plurality of alternately spaced retaining lip portions and concave relieved portions, said track fitting comprising an elongated housing having a length at least as great as the axial distance between four of said spaced retaining lip portions, aperture means in an upper portion of said housing for anchoring a load to said fitting, a plurality of lobe members mounted within said housing, said lobe members being shaped so as to be capable of being dropped vertically through a plurality of said concave relieved portions in said track and then moved axially with said housing along the track to bring said lobe members under the retaining lip portions, a pair of spring loaded shear pins mounted in said housing, said shear pins being capable of being moved downwardly into two of said plurality of concave relieved portions in said track when said lobes underlie said retaining lip portions to contact the edges of said concave relieved portions and restrict horizontal movement of said fitting in said track while said lobe members contact the underside of said retaining lip portions to restrict upward movement, a pair of horizontal, transverse pivot members mounted in said housing at spaced locations along the length thereof, the first of said pivot members providing the support for first pivoted support plate means which carry the lobe members which are adapted to engage the first and third of any four consecutively axially spaced lip portions in said track and the second of said pivot members providing the support for second pivoted support plate means which carry the lobe members which are adapted to engage the second and fourth of said four consecutively axially spaced lip portions in said track.

4,047,690

MOLD FOR CONCRETE TEST CUBE

Wilhelm Winter, and Artur Held, both of Frankfurt am Main, Germany, assignors to FORM-PLAST GmbH, Frankfurt-Kalbach, Germany

Filed Mar. 31, 1975, Ser. No. 563,375
Claims priority, application Germany, Apr. 3, 1974, 117467
Int. Cl.[2] B28B *7/08, 7/12*
U.S. Cl. 249—66 A **6 Claims**



1. A mold for concrete test cubes, comprising:
a vertically extending wall defining a tubular enclosure,
a flange-like first impact projection extending angularly from the enclosure on the outside thereof and located spaced from the bottom of the enclosure, said flange-like projection constituting the only substantial projection beyond the enclosure between the top and bottom thereof, the first projection forming an impact surface when said enclosure is tilted from a vertical to a substantially horizontal position; at least three vertically extending second impact projections formed on the top end of the enclosure, said second projections being relatively small and effective to permit a multidirectional planar smoothing of substantially the whole upper surface of the concrete test cube prior to solidification;
and a bottom panel secured to the bottom of the enclosure and having an opening provided therein; said panel and said enclosure being formed of plastic or plastic-like material as an integrally connected single piece construction.

4,047,691

FIXTURE FOR USE IN THE FORMATION OF A DISCHARGE OPENING OF A FODDER SILO

Johann Wolf, Scharnstein, Austria, assignor to Johann Wolf Gesellschaft m.b.H. KG., Scharnstein, Austria

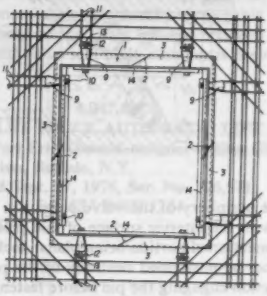
Filed Jan. 26, 1976, Ser. No. 652,573
Claims priority, application Austria, Feb. 3, 1975, 775/75
Int. Cl.[2] E06B *1/04*
U.S. Cl. 249—97 **2 Claims**

1. A fixture for use in the formation of a discharge opening of a fodder silo of reinforced concrete during the placing of said concrete, which comprises
a form frame which consists of a plurlity of parts which are adapted to be taken apart, said form frame being adapted to define said discharge opening during the placing of said concrete,
anchors detachably connected to said form frame and adapted to carry reinforcements for reinforcing said concrete,
said form frame being adapted to be disconnected from said anchors when said concrete has been placed,
said anchors being adapted, when said concrete has been

placed and said frame has been disconnected from said anchors, to carry mounting means for mounting a door for closing said discharge opening,

each of said anchors comprising a tapped bushing having first and second ends and tapped bore portions extending from said ends,

said first end engaging said form frame and said second end being connected to said reinforcement,



said form frame being divided along a plurality of oblique planar interfaces,

plates which bridge said interfaces, and

screws that pass through said plates and form frame and detachably screw-threadedly engage in said first ends of said anchors. said tapped bore portions are portions of a continuous bore through each of said anchors.

4,047,692

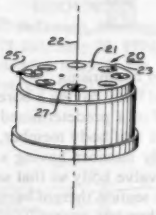
APPARATUS FOR MOLDING DYNAMICALLY BALANCED FANS

Richard E. Swin, Sr., 5302 Howard, Western Springs, Ill. 60558

Filed Sept. 24, 1975, Ser. No. 616,387

Int. Cl.² B28B *7/02, 7/16*

U.S. Cl. 249—142 **8 Claims**



1. In a mold for molding dynamically balanced plastic air movement devices comprising mold halves having complementary surfaces forming a mold cavity in the configuration of an air movement device, the improvement comprising

an insert supported in one of said mold halves for forming a portion of an air movement device, said insert having a plurality of adjustable plugs each movable into and out from the mold cavity for forming a balancing pad on said air movement device at a predetermined position to effect the dynamic balance of said air movement device.

4,047,693

SUPPORTING RING FOR USE IN THE CASTING OF CONCRETE PIPES

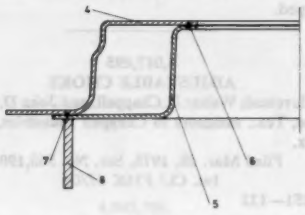
Bent Melchior Karlsen Holme, Brondersley, Denmark, assignor to Pedershaab Maskinfabrik A/S, Brondersley, Denmark

Filed Jan. 12, 1976, Ser. No. 648,539

Claims priority, application Denmark, Feb. 21, 1975, 676/75

Int. Cl.² B28B *21/76*

U.S. Cl. 249—187 R **1 Claim**



1. A supporting ring for casting machines for concrete pipes for use in moulding the socket end of the pipe and as a base for the green pipe during the removal of the casting mould and during the initial hardening of the concrete and transport of the green pipe, said supporting ring being formed by an annular body having a hollow portion of generally rectangular cross-section and comprising two rings of approximately Z-shaped cross-section, one Z-shaped ring being formed by a lower flange which projects laterally outwardly from the hollow portion for the moulding of the end face of the socket, a substantially plane top spaced from the lower flange for moulding of the end face of the pipe body inside the socket and wall means connecting the lower flange and the plane top, and the other Z-shaped ring having corresponding and generally parallel components including a bottom flange and a top flange welded to the lower flange and the plane top, respectively, said Z-shaped rings being produced from sheet metal.

4,047,694

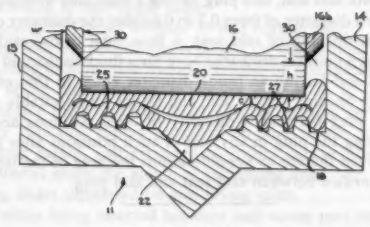
CLAMP FOR REGULATING FLOW THROUGH PLASTIC-TUBING

Marvin Adelberg, 16821 Oak View Drive, Encino, Calif. 91436

Continuation-in-part of Ser. No. 644,166, Dec. 24, 1975, Pat. No. 4,013,263. This application Jan. 31, 1977, Ser. No. 764,406

Int. Cl.² F16K *7/06*

U.S. Cl. 251—6 **5 Claims**



1. In a clamp for regulating fluid flow through plastic tubing having a body portion with a longitudinal clamping surface, a variable cross-section longitudinal channel being formed in or along said surface, a roller wheel mounted in said body for longitudinal motion parallel to said clamping surface, and a plurality of distributed raised portions separated from each other by discrete valley portions formed in said clamping surface for locally gripping the tubing wall at given locations thereby restraining the tubing so as to reduce creep thereof, the

tubing being clamped between the roller wheel and said surface, the improvement comprising:

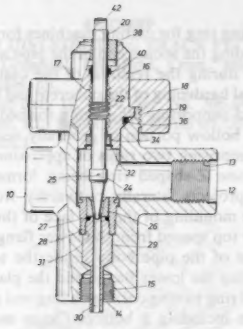
undercut stepped shoulder portions formed in the opposite edges of said wheel defining recesses in the wheel edges, the width of each of said recesses being of the order of twice the compressed wall thickness of the tubing, the height of each of said recesses being at least twice the width thereof, whereby the side portions of the tubing are permitted to migrate into said recesses without forming a flow lumen in said side portions when the tubing is being clamped.

4,047,695

ADJUSTABLE CHOKE

John T. Cleveland; Walter L. Chappell, and John D. Watts, all of Houston, Tex., assignors to Chappell Industries, Inc., Houston, Tex.

Filed Mar. 28, 1975, Ser. No. 563,190
Int. Cl.[2] F16K *47/04*
U.S. Cl. 251—122 **1 Claim**



1. An adjustable choke for metering a flow of fluid, comprising: a choke body having an inlet port to permit passage of fluid into said body and a discharge section through which fluid can depart said body; a valve seat having an inwardly tapering right conically shaped surface disposed within said choke body downstream of the inlet port, said seat having a discharge opening, the tapering surface of said seat having a length at least 0.25 times the diameter of said discharge opening; an axially movable plug extending through said seat and having a right conically shaped tapered outer surface parallel to said seat surface to define a tapered annular orifice in combination with said seat, said plug having a truncated downstream end with a diameter of from 0.2 to 0.6 times the diameter of the discharge opening of said seat; a flow tube below said seat providing a uniform discharge bore for a fluid discharged from said seat and having an inside diameter equal to that of said discharge opening of said seat; and means for adjustably moving said plug between a plurality of open positions and for maintaining the plug in any one of such positions after it has been moved thereto to variably adjust the area of the tapered annular orifice between said seat and said plug.

4,047,696

BUTTERFLY VALVE

George Ludwig, Troy, Mich., assignor to Tom McGuane Industries, Inc., Orchard Lake, Mich.

Filed Mar. 17, 1976, Ser. No. 667,637
Int. Cl.[2] F16K *1/22*
U.S. Cl. 251—308 **7 Claims**

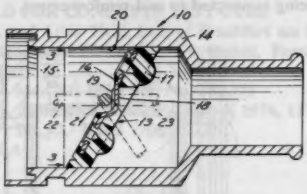
1. In a butterfly valve, the combination comprising

a housing having an opening therethrough,

at least a portion of said opening defining a cylindrical passage,

a pivot pin extending generally diametrally through said body across said passage,

and a valve plate having a diametrically extending central portion which extends radially of the passage and perpendicular to the axis of said passage when the valve plate is in inclined position with respect to the axis of said passage



and the periphery of the valve plate is in sealing engagement with the interior surface of said passage,

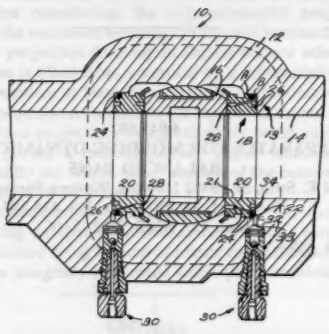
said last-mentioned portion being planar such that said valve plate can be positioned centrally of the passage with the flat portion engaging the pin before fastening said plate to said pin.

4,047,697

VALVE SEAT-TO-SEAT CONNECTION FOR EASY INSTALLATION AND REMOVAL OF SEAT

John K. McGee, Houston, Tex., assignor to Gray Tool Company, Houston, Tex.

Filed Mar. 26, 1975, Ser. No. 562,182
Int. Cl.[2] F16K *3/00*
U.S. Cl. 251—328 **11 Claims**



1. A valve assembly comprising

a. a valve body, said body having a bore therein, and having a section thereof of a predetermined inside diameter for receipt of a valve seat body member,

b. a valve seat body member having a bore therethrough, mounted in said valve body so that said bores are aligned and having a first section thereof having an outside diameter slightly less than but generally corresponding to said inside diameter of said valve body section, and having a second section thereof having an outside diameter less than the outside diameter of said first section, and

c. means for mounting said valve seat body member in said valve seat body so that said valve seat body member is readily detachably mounted in said valve body while also being tightly sealable therewith, said means including (i) a resilient metallic ring disposed around said second section of said valve seat body member and in engaging relationship with said valve body and said valve seat body member, said metallic ring having an outside diameter slightly greater than the inside diameter of said section of said

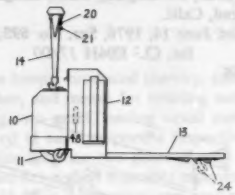
valve body in which said valve seat body member is mounted, and having an inside diameter slightly greater than the outside diameter of said second section of said valve seat body member, so that said ring will retain said valve seat body member within said valve body while still allowing ready detachment thereof, and (ii) means for selectively supplying a material under pressure to said ring to force said ring into tighter engagement with said valve seat body member and said valve body so that said valve seat body member is not readily detachable from said valve body and so that fluid leakage between said valve body and said valve seat body member is prevented.

4,047,698

PALLET TRUCK AUTOMATIC LIFT

Arthur S. Ellis, Fort Erie, Canada, assignor to Blue Giant Equipment Corporation, Buffalo, N.Y.

Filed Sept. 27, 1976, Ser. No. 726,571
Int. Cl.² B66F *3/24*
U.S. Cl. 254—2 R **10 Claims**



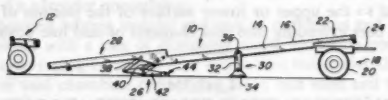
1. In a lift truck, a frame structure and a lift structure mounted thereon for vertical movement to raise and lower pallets and the like, means for effecting up and down movement of said lift structure, a pair of manually operable controls for selectively activating said means for up or down movements of said lift structure, an auxiliary electric circuit operable when both of said controls are in released position to activate said means for up movement of said lift structure when the same is in a lowered position, and a switch in said auxiliary circuit adapted to be opened by upward movement of said lift structure to a predetermined point at which the lift structure is safely out of contact with the floor upon which the truck is operating.

4,047,699

APPARATUS FOR LOWERING A TRAILER TO THE GROUND

Gerald F. Wisdom, 337 Delaware, Sterling, Colo. 80751

Division of Ser. No. 471,241, May 20, 1974, Pat. No. 3,894,747.
This application May 8, 1975, Ser. No. 575,716
Int. Cl.² B62D *53/06*
U.S. Cl. 254—86 H **1 Claim**



1. A lift mechanism for elevating a platform or the like comprising in combination:

at least two pair of laterally spaced link members, said pairs being spaced in a longitudinal direction with each link in the pairs having one end operatively connectable to said platform,

elongated main arm members, said pairs of link members being connected to said main arm members at spaced locations along the length of the main arm members,

abutment means connected to one end of said main arm members adapted to abut a reference surface away from which the platform is to be lifted, and

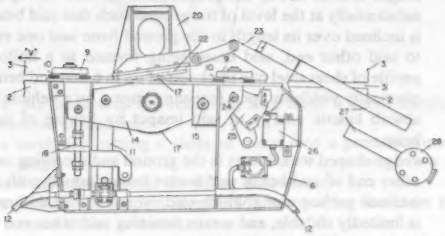
power lift means operatively connectable at one end to said platform and at the other end to an intermediate location on said main arm members, said intermediate location being spaced from the locations where the link members are connected to said main arm members so as to effect extension and retraction of said abutment means relative to said platform.

4,047,700

APPARATUS FOR MAKING TANKS FROM PLATES

Hans Koller, Lausen, Switzerland, assignor to BUSS A.G., Basel, Switzerland

Filed May 17, 1976, Ser. No. 682,376
Int. Cl.² B66F *7/12*
U.S. Cl. 254—89 H **9 Claims**



1. A cylindrically jacketed apparatus for constructing a tank which is formed from separate plates which are vertically disposed and joined together comprising:

a bottom part of a cylindrical jacket having a bottom ring attached thereto and being formed with an upper helically shaped edge;

a cover part of said cylindrical jacket comprising a cover with a cover ring attached thereto;

said cover part having a lower helically shaped edge corresponding to said upper edge;

a plurality of frames fastened to said bottom part;

lifting units for said frames arranged on said bottom part;

the lifting units for said frames arranged on said bottom part;

said lifting units moving the cover part so as to lift and displace the cover part relative to said bottom part;

freely rotatable rollers provided on said frames for said lifting means, and arranged so rollers can be lifted and lowered under the action of said lifting units;

lifting slides supported on said lifting units;

said slides being inserted between said cover part and said bottom part;

a roller surface on said slides extending in the opposite direction to the inclination of the helical line along said helically shaped edge;

said lifting units including a lifting cylinder, a plunger connected to the cylinder and a lifting beam;

each of said rollers being arranged and supported on said lifting beam;

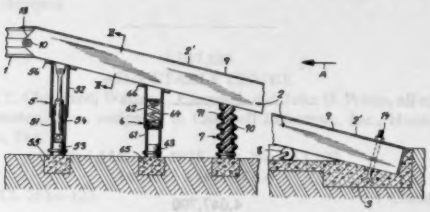
and said beam being pivoted at one end on the respective frame and having a free end which is connected to the plunger of said lifting cylinder.

4,047,701

END ASSEMBLY FOR ROADWAY GUARD RAIL

Ernest Glaesener, Differdange, Luxembourg, assignor to Arbed Acierles Reunies de Burbach-Eich-Dudelange S.A., Luxembourg, Luxembourg

Filed Oct. 29, 1975, Ser. No. 626,872
Claims priority, application Luxembourg, Oct. 31, 1974, 229
Int. Cl.[2] B66F *3/08*
U.S. Cl. 256—13.1 5 Claims



1. In combination with an elongated guardrail spaced above and extending generally parallel to the ground, an end assembly comprising:

an elongated beam at least 25 meters long and having one end secured to an end of said elongated guardrail at the height thereof above the ground, and another end lying substantially at the level of the ground such that said beam is inclined over its length to the ground from said one end to said other end, said beam being formed as a hollow profile of sheet steel of a thickness of up to 6 mm and being plastically yieldable upon receiving impact by a vehicle to absorb kinetic energy of said imapct by flexure of said beam;

a wedge-shaped socket inset in the ground and receiving said other end of said beam, said socket being formed with an inclined surface along which said other end of said beam is limitedly slidable, and means retaining said other end of said beam against said surface;

a plurality of upright posts spaced apart at distances of 2 to 8 meters from one another disposed directly beneath and coplanar with said beam, each of said posts having an upper end secured to said beam, a lower end fixed to the ground, and means between said ends compressible upon deformation of said beam in a vertical direction by a vehicle riding up on same to absorb at least a portion of the kinetic energy of said vehicle, said posts contracting vertically only upon the application of a compressive force thereto enabling said beam to yield vertically in response to a vehicle riding up upon said beam.

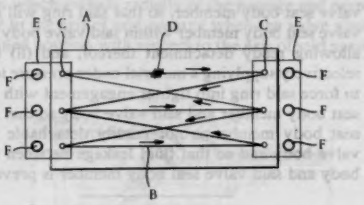
4,047,702

DEVICE FOR ABSORBING IMPACT ENERGY

Enrico Cernia, Rome, and Walter Conti, San Donato Milanese (Milan), both of Italy, assignors to Snam Progetti S.P.A., Italy

Filed Feb. 12, 1976, Ser. No. 657,694
Claims priority, application Italy, Feb. 12, 1975, 20192/75
Int. Cl.[2] E01F *15/00*
U.S. Cl. 256—13.1 3 Claims

1. A device for absorbing impact energy, comprising a water filled seal tight box, a plate secured to each end of said box having spaced holes therethrough, yarn of undrawn nylon 6 contained in said box and having a moisture content higher than two percent which is maintained at that level by the water in said box and which is wound in the form of a skein across said box by having said yarn pass through said holes in said plates, and wherein said yarn absorbs energy upon impact, and



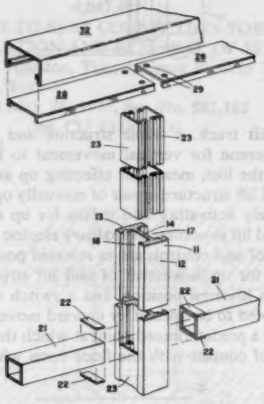
spaced guard rail structures between which and to which said box, plate and impact absorbing yarn are secured.

4,047,703

LINE RAIL CONSTRUCTION

Robert H. Murdock, Kensington, Calif., assignor to NEF Systems, Richmond, Calif.

Filed June 14, 1976, Ser. No. 695,827
Int. Cl.[2] E04H *17/00*
U.S. Cl. 256—68 7 Claims



1. A railing construction, comprising a plurality of line posts, each of said posts including a pair of channels disposed longitudinally therein, at least one railing bar secured with its ends disposed in opposed channels of adjacent line posts, a plurality of post inserts disposed within said channels for supporting and spacing said railing bars, means for securing said post inserts within said channels in the lateral direction, means for securing said post inserts and said railing bars in said channels in the longitudinal direction, and a plurality of resilient pads, each secured to the upper or lower surface of the portion of said railing bars extending into said channels of said line posts.

4,047,704

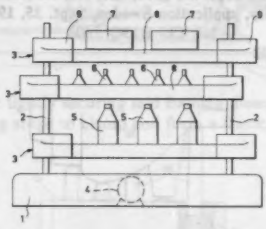
SHAKING MACHINE COMPRISING AT LEAST SUPPORTS FOR THE TREATED MATTER

Alexander Hawrylenko, Bottmingen, Switzerland, assignor to Infors AG, Switzerland

Filed Nov. 26, 1975, Ser. No. 635,315
Claims priority, application Germany, Jan. 1, 1975, 2503631
Int. Cl.[2] B01F *11/00*; B08B *3/12*; B01F *9/00, 13/00*
U.S. Cl. 259—1 R 3 Claims

1. In a shaking machine of the type having a frame, a drive mechanism and at least two supports, for the matter to be treated, which are mounted one above the other and guided and connected to the drive mechanism in a manner such that,

in operation, all points of the support can execute horizontal circular movements at mutually equal velocities along paths having mutually equal radii, the improvement comprising, in combination, at least one respective balance body connected to each support and mounted for rotation relative thereto in a manner such that, during operation of the machine, the center of gravity of each balance body executes a horizontal circular movement which is dephased, relative to the movement of the center of gravity of the associated support, by a constant phase angle; said balance bodies having dispositions and dimensions such that the inertia forces occurring during operation of the



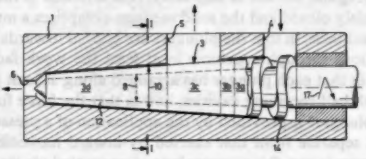
machine, and the torque produced thereby, substantially compensate each other; and means for rotating each said balance body comprising two gears, having equal numbers of teeth, rotatably mounted in each support, a respective transmission element interconnecting the two gears of each support, and a vertically oriented drive shaft rotatably mounted in said frame and driven by said drive mechanism; one gear on each support being non-rotatably and eccentrically supported on said drive shaft; the other gear on each support being non-rotatably connected to the balance body acting at the center of gravity of the associated support.

4,047,705

EXTRUDER WITH DUAL TAPERED SCREWS

Wilhelm Hanslik, Linz, Austria, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed Sept. 24, 1975, Ser. No. 616,375
Claims priority, application Germany, Sept. 28, 1974, 2446420
Int. Cl.[2] B01F *7/08;* B29B *1/10*
U.S. Cl. 259—192 4 Claims



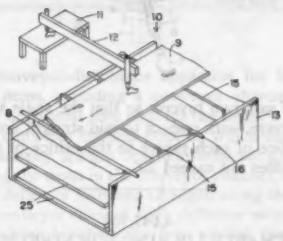
1. An extruder comprising:
a housing having an inlet end and an outlet end and
formed with a pair of elongated screw chambers conically converging from said inlet end to said outlet end, the axes of said chambers converging from said inlet end to said outlet end; and
a pair of similar elongated screws extending axially between said ends in the respective chambers,
said screws having screw threads of opposite hand meshing radially with a depth of mesh substantially equal to the thread depth,
said threads having crests converging from said inlet end to said outlet end and having outer diameters progressively decreasing along the length of each screw from said inlet end toward said outlet end,
the root diameter of each screw progressively decreasing from said inlet end toward said outlet end,
each thread having a thread depth progressively decreasing from said inlet end toward said outlet end,
the outer diameter of each thread constituting the major diameter thereof at any specific location along said length,
the depth of mesh and the major diameter of each screw at each such location forming a ratio between substantially 15:100 and 25:100 and which is substantially constant between said ends.

4,047,706

TORCH CUTTING SYSTEM WITH AUTOMATED WORK SUPPORT MECHANISM

Harlan C. Tronvold, Minneapolis, Minn., assignor to Paper, Calmenson & Co., St. Paul, Minn.

Filed Oct. 18, 1976, Ser. No. 733,288
Int. Cl.[2] B23K *37/04*
U.S. Cl. 266—49 8 Claims



1. An apparatus for removing slag from a torch cutting operation comprising:
a torch for cutting a sheet of metal into a predetermined shape;
a water tank suitable for filling with water;
a plurality of support members for supporting the sheet of metal above said tank;
a porous conveyor located in said tank, said conveyor having openings of sufficient size to allow slag to fall therethrough but sufficiently small to prevent the article cut from the sheet of metal from falling therethrough, said conveyor operable for transporting the article to a finishing area and for transporting slag to a collection area located in said tank, and means for propelling said conveyor.

4,047,707

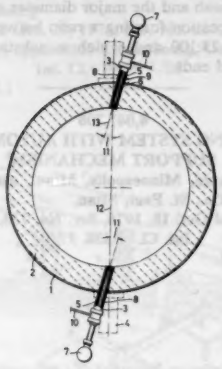
PROCESS AND CONVERTER FOR REFINING LIQUID METALS

Helmut Knuppel; Karl Brotzmann, and Hans Georg Fassbinder, all of Sulzbach-Rosenberg, Germany, assignors to Eisenwerk-Gesellschaft Maximilianshutte mbH, Sulzbach-Rosenberg, Germany

Continuation of Ser. No. 501,008, Aug. 27, 1974, abandoned, which is a division of Ser. No. 402,695, Oct. 2, 1973, Pat. No. 3,920,448. This application June 9, 1976, Ser. No. 694,413
Claims priority, application Canada, Oct. 3, 1972, 153166/72
Int. Cl.[2] C21C *5/48*
U.S. Cl. 266—222 3 Claims

1. In a refractory, masonry lined tiltable refining vessel with a pivot and a nearly circular horizontal cross section wherein oxygen surrounded by fluid hydrocarbons is introduced into a bath of molten metal to be refined in said vessel through tuyeres each of which includes an inner pipe for the oxygen and an outer pipe concentric with the inner pipe, the space between said pipes being for the introduction of said hydrocarbons, the improvement which comprises:
mounting two of said tuyeres in the refractory masonry in said vessel opposite to one another and below the pivot of said vessel;

each of said tuyeres being located in the side wall of said vessel and being disposed horizontally when the vessel is in the refining position and being inclined with respect to a vessel diameter straight line connecting the orifice of



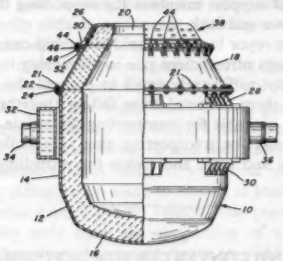
each of said two tuyeres so that the angle subtended by each tuyere, with respect to said straight line connecting the orifice of each tuyere to the orifice of the opposing tuyere does not exceed 20°.

4,047,708

DETACHABLE LIP RING FOR STEELMAKING CONVERTER

Edward J. Lee, Hobart, and Frank Vavra, Ross, both of Ind., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 4, 1976, Ser. No. 729,568
Int. Cl.² C21C *5/46*
U.S. Cl. 266—243 **6 Claims**



1. In a converter for the pneumatic refining of metals including a generally cylindrical refractory-lined shell having an annular opening at one end of the shell axis and entending transversely thereof and an annular refractory-lined lip ring assembly detachably mounted on said shell in surrounding relation to said opening and wherein the interface between said shell lining and said lip ring lining is substantially normal to said shell axis, the improvement comprising means for mounting said lip ring assembly upon said shell including:

a. a first annular flange fixedly attached to the exterior surface of said shell about said annular opening and being formed as a conical frustrum defining an angle with respect to the interface between said shell and lip ring linings;

b. a second annular flange fixedly attached to the exterior surface of said lip ring assembly adjacent the bottom thereof, said second flange being formed as a conical frustrum and having a bearing surface for engaging said first annular flange in mating facing relation; and

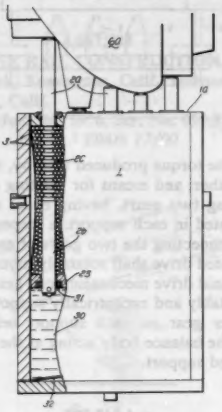
c. a plurality of circumferentially spaced, detachable bolts penetrating said flanges in angularly disposed relation to said shell and lip ring interface and operative to place said mating flange surfaces in tight contiguous relation.

4,047,709

CLAMPING DEVICE FOR WORK PIECES OF IRREGULAR SHAPE

Bertil Sven Johan Thyberg, and Karl Arne Stig Elmgren, both of Huskvarna, Sweden, assignors to AB Westin & Backlund, Stockholm, Sweden

Filed Sept. 20, 1976, Ser. No. 725,035
Claims priority, application Sweden, Sept. 25, 1975, 7510731
Int. Cl.² B23Q *3/08*
U.S. Cl. 269—22 **16 Claims**



1. Apparatus for supporting or clamping bodies or irregular shape, (e.g. cast or forged blanks or other workpieces) comprising one or more clamping jaws, each in the form of a box with a multiplicity of individual axially moveable plungers extending from at least one side wall of said box, which box is partially filled with a solid medium which acts to support the plungers in different axial positions determined by contact with the irregular surface of said body, characterised in that the box is mainly closed and the solid medium comprises a multiplicity of hard balls, in that the plungers are biassed towards extended positions through apertures in at least the work face of said box, in that each plunger has arranged along at least part of its length ball-receiving cavities; and in that the force for locking the plungers is provided by the application of a pressure to the balls separate from that exerted by inward movement of the plungers in use, this pressure being transmitted via the balls and their receiving cavities to said plungers.

4,047,710

FRAMING FORM AND CLAMP

John Wilson, 708 S. Higgins, Missoula, Mont. 59801

Filed Dec. 7, 1976, Ser. No. 748,366
Int. Cl. B25b *1/20*
U.S. Cl. 269—42 **16 Claims**

1. A framing form and clamp, comprising:

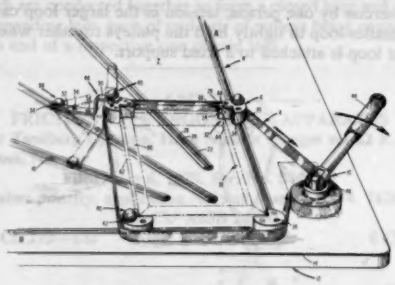
a base;

a plurality of guideways in said base;

framing means slidably mounted to said guideways;

bracket means having a first end slidably mounted to at least one of said guideways and a second end connected to one

of said framing means for positioning said one of said framing means between said guideways; and



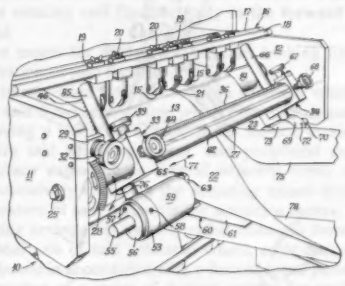
means for tightly securing said framing means around frame molding strips to clamp and form a frame.

4,047,711

ADJUSTABLE MOUNTING FOR PAPER PLOW

Clyde G. Gregoire, Bensenville; James A. Hartman, Brookfield, and Milton J. Gregoire, Lombard, all of Ill., assignors to Gregg Engineering Corporation, Lyons, Ill.

Filed Mar. 31, 1976, Ser. No. 672,397
Int. Cl.² B65H *45/22*
U.S. Cl. 270—86 **9 Claims**



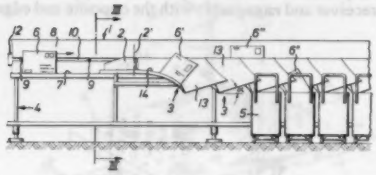
8. A plow for paper webs comprising a relatively thin piece of material having a generally rectangularly shaped flat portion defining oppositely disposed narrow ends and an arcuate circular portion upturned from one of said narrow ends of said rectangularly shaped flat portion and the flat and circular portions jointly forming a smooth undersurface, said arcuate circular portion having an extent at least one-quarter of the arc of an entire circle about an axial center of said arcuate circular portion, a bracket affixed to said flat portion and extending upwardly in the same direction as the upturned arcuate portion, said bracket having a pivot center located on the axial center of the arcuate circular portion of the plow, a shaft having its axis on the axial center of the arcuate circular portion of said plow, said bracket adapted for journal mounting on its pivot center about said shaft, and means adjustably positioning said plow about said pivot center.

4,047,712

CONVEYOR-DISTRIBUTOR APPARATUS FOR FLAT ITEMS

Gisbert Burkhardt, Reichenau, and Dieter Hofmann, Constance, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 27, 1976, Ser. No. 690,596
Claims priority, application Germany, May 30, 1975, 2523835
Int. Cl.² B65H *29/60*
U.S. Cl. 271—64 **6 Claims**



1. In a conveyor-distributor apparatus for handling flat rectangular items, including a conveyor channel defining a substantially horizontal feed path for the items; a support face defining the conveyor channel floor on which the lower edge of the substantially upright oriented items are guided; means for advancing the items in the conveyor channel; a plurality of consecutive deflector switches arranged along the conveying path of the conveyor channel, each deflector switch having an operative position in which the item passing therethrough is deflected from the conveyor channel and an inoperative position in which the item passing therethrough is unaffected and continues to proceed in the conveyor channel; a guiding device connected to each deflector switch for changing the orientation of the deflected items from their position they assumed in the conveyor channel to a flat-lying, stacking position; the improvement wherein each guiding device is constituted by a slide comprising

a. a curved deflecting surface having a first surface portion adjoining the associated deflector switch; said first surface portion being in alignment with the plane of the items as they emerge from the deflector switch subsequent to their deflection thereby; said deflecting surface further having a second surface portion bounded by a lower terminal edge; said second surface portion being inclined to the horizontal at an acute angle having an apex oriented towards the location of another upstream-positioned slide as viewed in the conveying direction of said conveyor channel; and

b. a curved supporting surface intersecting said curved deflecting surface substantially at a right angle, said curved supporting surface having a first surface portion adjoining said support face of said conveyor channel and a second surface portion substantially following the drop curve of the items on the slide for effecting a continuous contact with said lower edge of said items as they move down on the slide and are reoriented thereby.

4,047,713

SHEET JOGGER

Donald L. Snellman; John C. Kuspert, both of Seattle, and Arthur G. Saunders, Maples Valley, all of Wash., assignors to Norfin, Inc., Seattle, Wash.

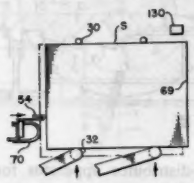
Division of Ser. No. 387,541, Aug. 10, 1973, Pat. No. 4,009,071.
This application Jan. 12, 1976, Ser. No. 648,206
Int. Cl.² B65H *31/38*
U.S. Cl. 271—221 **4 Claims**

1. In combination with a sheet receiver including a vertical column of sheet receiving compartments, jogging means including side jogging means mounted adjacent one side of the receiver and movable with respect to a side jogging position in simultaneous contact with the side edges of stacked sheets in said compartments for establishing coplanar alignment thereof,

and side backup means mounted adjacent the opposite side of the receiver and engageable with the opposite side edges of the stacked sheets in said compartments for establishing coplanar edge alignment thereof simultaneously with operation of said side jogging means, the improvement comprising:

end jogging means mounted adjacent one end of the receiver and movable between a retracted position spaced from the end edges of the stacked sheets in said compartments and an advanced jogging position in simultaneous contact with the end edges of the stacked sheets in said compartments for establishing coplanar alignment thereof;

backup means mounted adjacent the opposite end of the receiver and engageable with the opposite end edges of the



stacked sheets in said compartments for establishing coplanar alignment thereof simultaneously with operation of said end jogging means; and

sheet stop means mounted by the receiver adjacent said end jogging means at a location intervening between said retracted position and said advanced jogging position for engaging the end edges of sheets entering said compartments from the opposite end of the receiver toward the one end thereof, and positioning the sheets upon such entry thereof into said compartments with their end edges spaced from said advanced position a sufficient distance that said end jogging means may thereafter contact the sheet end edges and move the sheets against said backup means into coplanar end edge alignment.

4,047,714

PUSH PULL TYPE EXERCISING DEVICE

Truman W. Powell, P.O. Box 535, Zephrhills, Fla. 33599

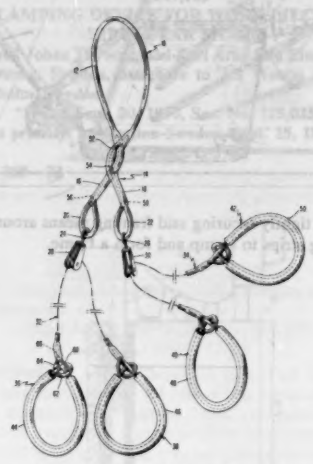
Filed Apr. 15, 1976, Ser. No. 677,166

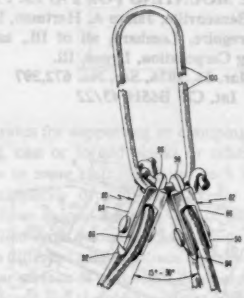
Int. Cl.[2] A63B *21/00*

U.S. Cl. 272—116 **8 Claims**

3. In an exercising apparatus of the type having a pair of flexible lines each terminating at each end in a loop for engagement by the hands or feet of a user, a support assembly for attachment to a fixed support, and a pair of pulleys connected to said support assembly, said flexible lines passing over said pulleys whereby said flexible lines may be tensioned by the user and reciprocated over said pulleys in thhe performance of exercises, the improvement wherein said support assembly comprises loop means including a single, unbroken length of flexible line one end of which passing through each of said pulleys in one direction and being knotted adjacent one of said pulleys and the other end passing through each of said pulleys in the opposite direction and being knotted adjacent the other of said pulleys, said loop means supporting and drawing said pulleys together, by the cooperative action of said knots, when said line is placed in tension.

4. In an exercising apparatus of the type having a pair of flexible lines each terminating at each end in a loop for engagement by the hands or feet of a user, a support assembly for attachment to a fixed support, and a pair of pulleys connected to said support assembly, said flexible lines passing over said pulleys whereby said flexible lines may be tensioned by the user and reciprocated over said pulleys in the performance of exercises, the improvement wherein said support assembly comprises a single length of flexible line passing twice through each of said pulleys to form a support loop, the ends of said single length of line being knotted together to form a double loop whereby each loop has substantially the same dimension when the pulleys are pulled apart from each other for exercise by two persons and whereby one loop has a much larger dimension than the other when the pulleys are placed together for exercise by one person, tension in the larger loop causing the smaller loop to tightly hold the pulleys together when the larger loop is attached to a fixed support.





5. In an exercising apparatus of the type having a pair of flexible lines each terminating at each end in a loop for engagement by the hands or feet of a user, a support assembly for attachment to a fixed support, and a pair of pulleys connected to said support assembly, said flexible lines passing over said pulleys whereby said flexible lines may be tensioned by the

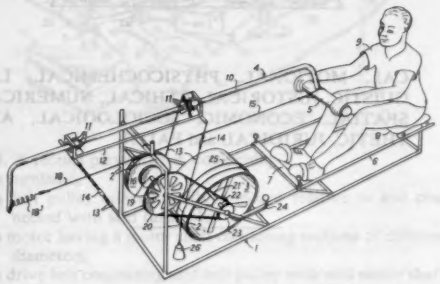
user and reciprocated over said pulleys in the performance of exercises, the improvement wherein said support assembly comprises a length of flexible line two intermediate portions of which are connected together to form a closed loop and a pair of depending legs, each of said pair of pulleys being connected to an end of a respective one of said legs.

4,047,715

FRICTION TYPE ERGOMETER APPARATUS

Einar Tandberg Gjessing, Hans Nielsen Hauges vei 22 F, 1500 Moss, Norway

Filed June 6, 1975, Ser. No. 584,503
Claims priority, application Norway, June 7, 1974, 742081
Int. Cl.² A63B *21/00*
U.S. Cl. 272—132 **6 Claims**



4. Ergometer apparatus comprising:

a flywheel;

a reciprocating actuating means reciprocated by muscle power of a user in a forward direction and a return direction;

a force transmission means operatively coupling said actuating means during movement in its forward direction, the direction in which the flywheel rotates, to said flywheel for rotating said flywheel only in the forward direction; and

brake means for applying a constant braking force to the rotation of said flywheel;

said transmission means including a rotatable wheel coupled to said flywheel by a free wheel gear, said rotatable wheel having a peripheral engagement surface in engagement with said actuating means, said peripheral engagement surface extending in several adjacent turns, said turns successively receiving the actuating means during reciprocation of said reciprocating actuating means, said turns being arranged at varying radial distances from the rotational axis of said rotatable wheel, such distances being selected in accordance with a desired speed pattern, representative of a series of desired speeds, for each forward stroke of said reciprocating actuating means so that when said actuating means is moved in accordance with such desired speed pattern then said rotatable wheel rotates with an approximately uniform rotational movement, and said free wheel gear permitting movement of said actuating means in its return direction without affecting the rotation of said flywheel.

4,047,716

PEG GAME WITH SPINNER-TYPE TIMER

John Plech, Jr., 4407 Broadale Ave., Cleveland, Ohio 44109

Filed Apr. 21, 1976, Ser. No. 678,934
Int. Cl.² A63F *9/00*
U.S. Cl. 273—1 R **8 Claims**

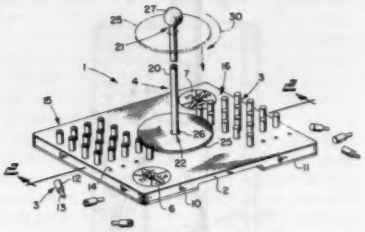
1. A game, comprising

a board,

a plurality of play members positionable on said board,

said play members being removable from and positionable on said board by a player during a play,

timer means for timing a duration for each play, said timer means including an elongate, relatively rigid rod-like member having a generally rounded cross section and opposite ends, and movable, relatively rigid disc-like means movably positioned with respect to said rod-like member for moving in a direction from one to the other of said ends in response to gravitational force, said disc-like means having a substantially centrally located opening



through which said rod-like member extends, whereby upon rotation of said disc-like means the centrifugally created frictional forces with said rod-like member tend to oppose such gravitational forces to reduce the speed at which said disc-like means moves in said direction and thereby to time such duration, and said opening being of a sufficiently larger size than such rounded cross section, whereby when said disc-like means is not rotating it is relatively freely movable on said rod-like member, and

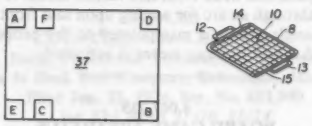
means for coupling said timer means to said board.

4,047,717

VOLLEY TENNIS GAME

Gloria J. DeAngelis, Elmhurst, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1975, Ser. No. 605,545
Int. Cl.² A63B *71/02, 59/00, 63/00*
U.S. Cl. 273—95 H **12 Claims**



1. A volley tennis game, for a plurality of players in two teams, comprising

a ball of substantially volley ball size;

a pair of portable basket members each held by a corresponding player of a corresponding one of the teams;

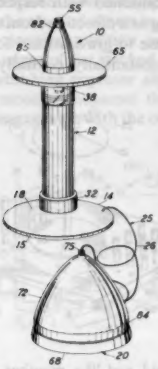
a plurality of ball striking members held by the remaining players of the teams, each ball striking member comprising a frame having a net of cord-like members supported therein in matrix configuration, said ball striking members being utilized to strike the ball in attempting to hit the ball into the basket member of the other team; and

a court for positioning the players, said court being substantially rectangular and having four squares each in a corresponding corner of the rectangle and each positioning a player and restricting the player's position to the confines of the square and an additional two squares at opposite sides of the rectangular court and intermediate the corners of the corresponding sides each positioning a basket member holding player and each restricting the player's position to the confines of the square.

4,047,718
TOY GAMING DEVICE

Angelo Montano, 847 E. 232 St., Apt. 3A, Bronx, N.Y. 10466

Filed Sept. 27, 1976, Ser. No. 726,644
Int. Cl.[2] A63B 67/10
U.S. Cl. 273—98 10 Claims



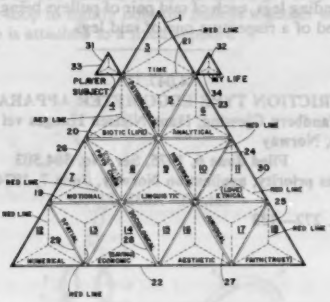
1. A toy comprising:
a. elongated handle means having a front end with a base mounted at the rear end thereof and being suitable for holding in the hand,
b. lighting means including a lamp mounted within said handle means and including a switch having a portion thereof extending outwardly above said front end of said handle such that when said switch is depressed said lamp is adapted to be energized and light is emitted therefrom,
c. translucent means for visibly displaying the light emitted from said lamp through said handle means so as to visually inform the user of the toy when said switch is depressed,
d. a hood having an axially extending cavity at one end thereof adapted to receive therein said front end of said handle means in telescopic relationship to each other for activating said switch, and
e. flexible means having one end secured to said handle means and the other end thereof secured to said hood so as to suspend said hood from said handle means to swing said hood through an arc for seating upon said front end when said handle means is manipulated to the proper position such that said lighting means is activated.

4,047,719
BOARD GAME APPARATUS

Miriam D. Sajkovic, South Hadley, Mass., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Continuation-in-part of Ser. No. 553,490, Feb. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 433,156, Jan. 14, 1974, abandoned. This application May 24, 1976, Ser. No. 689,485
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—130 R 4 Claims

1. Game apparatus, comprising
a game board having an equilateral triangular configuration divided into sixteen equal equilateral minor triangular areas formed by three groups of spaced parallel lines, each group of lines being parallel to a corresponding side of the game board, each of the minor triangles having three angle bisecting lines intersecting therewithin to form an inner pole, the apices of each minor triangle forming three poles thereof representing *x*, *y* and *z* spatial coordinates and the inner pole representing the time coordinate whereby a viewer of the inner pole of a minor triangle sees a four coordinate system symbolizing the game apparatus, said game board having a peak minor triangle marked TIME, and the other minor triangles of the game board in descending order from left to right being respectively marked BIOTIC, PSYCHOLOGICAL, ANALYTI-

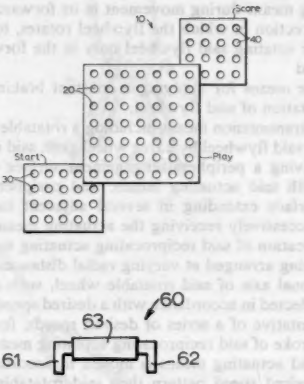


CAL, MOTIONAL, PHYSICOCHEMICAL, LINGUISTIC, HISTORICAL, ETHICAL, NUMERICAL, SPATIAL, ECONOMIC, SOCIOLOGICAL, AESTHETIC, JURIDICAL and FAITH.

4,047,720
GAME INCLUDING NOVEL BOARD AND PLAY PIECES

Jon S. Galdal, 140 Highland Ave., Edison, N.J. 08817

Filed July 8, 1976, Ser. No. 698,061
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—130 R 4 Claims

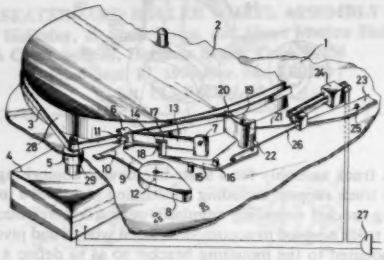


1. Game apparatus comprising
a game board having means for receiving play pieces,
said board including: means defining a starting area on said board, means defining a play area distinct from said starting area on said game board, and means defining a scoring area on said game board distinct from said starting and play areas, and
a set of play pieces for each player, each set of play pieces including pieces having different blocking values, due to their mechanical configuration, with respect to pieces of another set,
said play pieces being generally U-shaped and having different lengths and different heights.

4,047,721
DRIVE DEVICE WITH BELT AND STEPPED SPEED PULLEY

Hans Hermann, St. Georgen, Germany, assignor to Dual Gebruder Steidinger, St. Georgen, Black Forest, Germany

Filed Apr. 16, 1976, Ser. No. 677,736
Claims priority, application Germany, Apr. 19, 1975, 2517395
Int. Cl.[2] G11B *3/60*; F16H *7/08*
U.S. Cl. 274—9 A 4 Claims



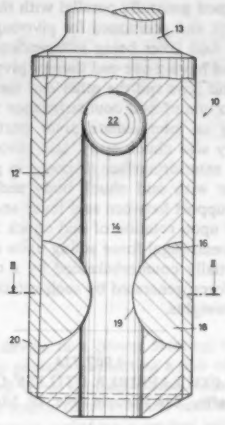
1. A record player drive, comprising
a turntable,
a belt pulley concentrically disposed relative to and connected with said turntable,
a motor having a motor shaft containing sections of different diameters,
a drive belt connecting said belt pulley with said motor shaft,
a guide fork means for shifting said drive belt on said sections of different diameter of said motor shaft,
an operating element means for adjustment into different setting positions each corresponding to a specific turntable drive rotational speed and for being held in said positions thereof, respectively,
means for blocking the shifting movement of said guide fork means, said blocking means is operatively independent from said operating element means,
elastic coupling means disposed between said guide fork means and said operating element means for exerting a shifting force on said guide fork means when said operating element means is adjusted to one of said positions corresponding to one drive rotational speed when said guide fork means is blocked in another position corresponding to another drive rotational speed,
switching means for opening and closing of a motor electric circuit,
said blocking means being operatively coupled with said switching means for opening and closing of the motor electric circuit, such that with opened electric circuit the blocking is operative and with closed electric circuit the blocking is inoperative.

4,047,722
HAMMER DRILLING DEVICES

Mogens B. Nielsen, Glostrup; Niels Halfdan Boa, Greve Strand, and Jimmy Jensen, Glostrup, all of Denmark, assignors to H. Reinholdt A/S, Farum, Denmark

Filed Aug. 19, 1975, Ser. No. 605,817
Claims priority, application Germany, Aug. 19, 1974, 2440082; Oct. 29, 1974, 2451265
Int. Cl.[2] B23B *31/06, 51/08, 51/12*
U.S. Cl. 279—19.5 15 Claims

1. A rotational drilling device comprising in combination two releasably connected parts, one of said two parts being a drill with a substantially cylindrical shaft and the other of said two parts being a tool receiving means with a substantially cylindrical bore in which said shaft is received for limited axial movement, said tool receiving means being adapted for connection to rotatable and percussive drive means and having means for imparting rotative and percussive movement to said drill, one of said two parts comprising in relation to said shaft at least one radially extending element which is fixably secured and the other of said two parts comprising in relation to said shaft at least one substantially axially extending elongated recess, said recess having first and second closed axial ends opposite to each other, said recess having a radial depth which corresponds to the radial extension of said element, said recess having a transition surface starting at the radially deepest area of the recess and extending substantially concentrically in relation to the axis of said part provided with said recess, said

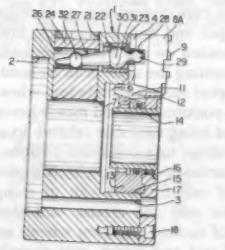


transition surface starting at a position spaced from said first and second ends of the recess, said transition surface intersecting the longitudinal edge of the recess which is kept free from the transfer of the rotational force by said element, and a guiding surface open at one end and closed in axial direction at its opposite end and connected by said transition surface with said recess, said guiding surface having the same radial depth as said recess and being off-set in circumferential direction in relation to said recess.

4,047,723
COUNTERBALANCED CHUCK

James R. Buck, Prairieville Township, Berry County, Mich., assignor to Buck Tool Company, Kalamazoo, Mich.

Filed Jan. 23, 1976, Ser. No. 651,949
Int. Cl.[2] B23B *31/16, 31/14*
U.S. Cl. 279—121 8 Claims



1. In a jaw chuck having a plurality of radially movable jaws and guide slots positioned radially in a chuck body receiving and guiding said jaws, actuating means connected to said jaws effecting radial movement thereof for gripping a workpiece, and means counterbalancing at least a portion of the centrigual force generated in said jaws upon rotation of said chuck, com-

prising the improvement wherein said counterbalancing means is independent of said actuating means and includes;

weight openings in said chuck body positioned parallel to and spaced from said slots and so spaced in a direction parallel with the rotational axis of said chuck;

a counterbalance weight movably guided within each said weight opening;

a lever opening in said chuck body parallel to the rotational axis of said chuck and connecting each of said weight openings to a corresponding one of said slots; and

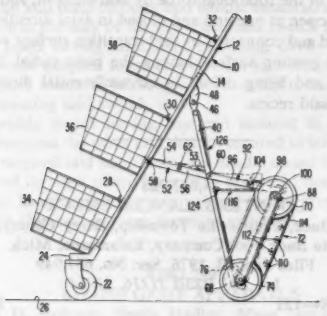
a lever aligned generally parallel with the rotational axis of said chuck and positioned for pivoting within said lever opening, said lever being independent of said actuating means and having one end thereof pivotally connected to one of said jaws and the other end thereof pivotally connected to one of said counterbalance weights, said lever including an intermediate pivot portion pivotally supported by said chuck body, said pivot portion having a rounded exterior surface disposed in pivotal bearing engagement with said chuck body and defining the sole pivotal support between said lever and said chuck body, whereby upon rotation of said chuck the moment generated by centrifugal force acting upon said jaws will be at least partially counterbalanced by a corresponding centrifugal force generated by such rotation of said counterbalance weights.

4,047,724

COLLAPSIBLE UTILITY CART

Robert H. Shaffer, 316 Escuela - No. 10, Mountain View, Calif. 94040

Filed Mar. 15, 1976, Ser. No. 666,555
Int. Cl.[2] B62B *1/08*
U.S. Cl. 280—5.22 **12 Claims**



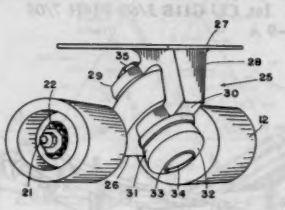
1. A utility cart comprising: an elongated frame having a normally upper end and a normally lower end; rod means pivotally mounted on the frame intermediate the ends of the frame for mounting the same in an inclined position with reference to a support surface therebelow when said rod means is in an operative position, said rod means having a normally lower extremity and being movable relative to said frame from said operative position to a collapsed position adjacent thereto; a first pair of surface-engaging wheels mounted on the normally lower end of said frame; a pair of elongated stair-climbing assemblies for said rod means, said assemblies including a second pair of surface-engaging wheels adjacent to the lower extremity of said rod means, said assemblies being pivotally mounted on the lower extremity of said rod means and movable relative thereto from respective operative positions extending upwardly and away from said rod means to collapsed positions extending adjacent to and along said rod means; means holding said rod means and said assemblies in respective operative positions; and means on said frame for removably mounting at least one basket thereon.

4,047,725

TRUCK ASSEMBLY FOR A SKATE-LIKE DEVICE

Donald E. Pinchock, Blairsville, Pa., assignor to Metcom Products Company, Blairsville, Pa.

Filed Jan. 16, 1976, Ser. No. 649,909
Int. Cl.[2] A63C *17/02*
U.S. Cl. 280—11.28 **11 Claims**



1. A truck assembly for a skate-like device comprising:

A. a truck support including a mounting plate and a mounting bracket extending angularly outward therefrom;

B. a truck adapted to accomodate axled wheels and pivotally mounted to the mounting bracket so as to define a fixed axis of rotation at an acute angle to the mounting plate, said truck having a central aperture therethrough;

C. means positioned along the axis of rotation and resiliently engaging said truck to resist rotation of the truck, said means including an annular insert positioned within the aperture of the truck and keyed thereto, said insert having at least one recessed cam surface, an annular cam follower extending into the insert and mating with the cam surface and a resilient pad positioned adjacent the cam follower whereby rotation of the truck and insert causes the follower to move along the cam surface in a direction along the axis of rotation and out of the insert, said movement being resisted by the pad; and

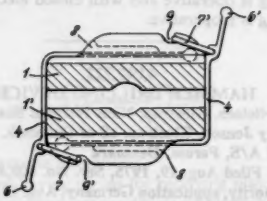
D. an adjustment pin extending along the axis of rotation and through the bracket, the truck and the resisting means to increase or decrease the resilient engagement of the resisting means.

4,047,726

DEVICE FOR BUNDLING SKIS TOGETHER IN PAIRS

Walter Kokeisl, Zurlindenstrasse 21, 5000 Aarau, Switzerland

Filed Feb. 26, 1976, Ser. No. 661,519
Claims priority, application Switzerland, Feb. 27, 1975, 2467/75
Int. Cl.[2] A63C *11/02*
U.S. Cl. 280—11.37 A **12 Claims**



1. A device for tying together a pair of skis assembled back-to-back, comprising:

at least one flat casing including a base mounted on an upper ski surface and a holder secured to said base, said casing forming a transverse channel terminating in a slot set back from an edge of said base;

a strap held under elastic tension in said channel and terminating in a tab emerging from said slot; and

a ring carried by said tab, said tab and ring normally overlying a portion of said base without projecting beyond said

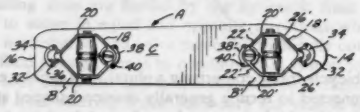
edge, said casing being provided on its side opposite said slot with a hook engageable by the ring of an identical device.

4,047,727

SKATEBOARD ROLLER WHEEL ASSEMBLY

Mark Holladay, 29 Sixth Street, and Daryl Mattew Hall, 55-10th Court, both of, Hermosa Beach, Calif. 90254

Filed Sept. 17, 1976, Ser. No. 724,370
Int. Cl.[2] B62B 3/00
U.S. Cl. 280—87.04 A 7 Claims



1. In combination with an elongate skateboard that has a platform that has a top surface on which a user stands and a bottom surface, a pair of longitudinally spaced roller wheel assemblies secured to said bottom surface, each of said roller wheel assemblies including:

a. a hollow rigid frame that includes a pair of transversely spaced side pieces that have forward and rearward ends, a pair of first legs that extend forwardly and inwardly from said first ends to develop at their forward extremities into an eye, a pair of second legs that extend rearwardly and inwardly from said second ends to develop at their rearward extremities into a ball, and said side pieces at substantially the centers thereof having transversely aligned bores defined therein;

b. first means secured to said bottom surface that resiliently engage said eye and force said frame to tilt transversely when said platform is tilted transversely by said user in guiding said skateboard in a curved path;

c. second means secured to said bottom surface that pivotally engage said ball;

d. a transverse shaft supported in said bores, said shaft including threaded end portions that project outwardly from said side pieces;

e. a pair of nuts that engage said end portions and removably hold said shaft in a fixed position in said frame;

f. a first ball bearing assembly mounted on substantially the center of said shaft and a pair of second ball bearing assemblies mounted on said shaft on opposite sides of said first ball bearing assembly and independently rotatable relative to the latter;

g. a first generally cylindrical roller wheel formed from a resilient polymerized resin rotatably supported on said shaft by said first ball bearing assembly; and

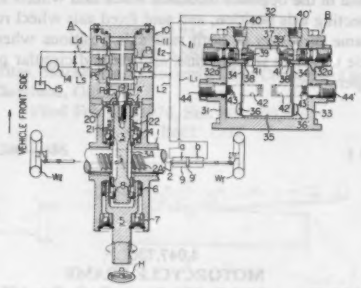
h. a pair of second generally frusto-conical roller wheels formed from a resilient polymerized resin rotatably supported on said shaft by said second ball bearing assemblies, said skateboard when guided in a straight path by said user having the major portion of the weight of said user supported on said first roller wheel and a minimum surface of said roller wheels in contact with a supporting surface on which said skateboard is used but said frame in cooperation with said first means and shaft forcing one of said second roller wheels into additional frictional rotatable contact with said supporting surface when said platform is transversely tilted by said user in guiding said skateboard in a curved path.

4,047,728

CORRECTION DEVICE IN A POWER STEERING APPARATUS FOR VEHICLES

Noriyuki Takahashi, Tokyo, and Kimio Miura, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 4, 1976, Ser. No. 693,264
Claims priority, application Japan, July 1, 1975, 50-81617
Int. Cl.[2] B62D 5/08
U.S. Cl. 180—141 3 Claims



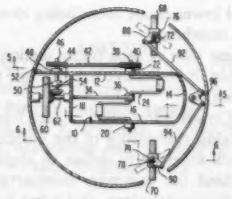
1. A correction device in a power steering apparatus for vehicles with a flow passage connecting a pair of working oil chambers partitioned by a working piston within a steering power cylinder to a source of oil pressure such as a hydraulic pump, said flow passage including a control valve for selectively controlling and supplying pressure oil from said oil pressure source into said pair of working oil chambers in response to rotative operation of a steering handle, the improvement comprising: a weight that may be oscillated in a lateral direction of the vehicle and is received in a closed oil chamber within a casing suitably mounted on the vehicle, a pair of left and right nozzle members with extreme nozzles thereof arranged opposite each other and disposed in said casing and leaving a desired clearance in opposite end surfaces of a pressure restriction plate formed integral with said weight, said nozzle members being internally brought into communication with said pair of working oil chambers respectively, within said power cylinder, stoppers disposed at tip surfaces of said nozzle members, said stoppers controlling the lateral oscillation of said pressure restriction plate to form a desired clearance between each of said opposite end surfaces and each of said nozzles.

4,047,729

DIRIGIBLE VEHICLE

Harry Tabb Smith, Box 437, Yorktown Road, Tabb, Va. 23602

Filed May 16, 1975, Ser. No. 578,349
Int. Cl.[2] B62K 5/02, 5/08
U.S. Cl. 280—267 8 Claims



1. A vehicle comprising a frame; at least three ground engaging wheels on said frame, vertical axes through the center of each of said wheels being substantially equally spaced from each other whereby said wheels form the corners of an equilat-

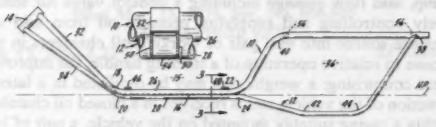
eral triangle; one of said wheels having a fixed horizontal axis of rotation with respect to said frame; driving means on said frame connected to said fixed axis wheel and linkage means for steering the others of said wheels about vertical axes of steering rotation through the center of each of said wheels to positions at which the horizontal axes of rotation of all wheels are parallel to each other, and to positions at which the horizontal axes of rotation of all wheels intersect at a common point at the center of said triangle, said dirigible wheels rotating in one direction when all of the wheels are in said parallel axis position and in the opposite direction when said wheels are in said intersecting axis position, and said fixed axis wheel rotating in the same direction in both said axis positions whereby said vehicle traverses straight line, arcuate and circular paths during operation.

4,047,730

MOTORCYCLE FRAME

David M. Panoz, 2669 E. 75th Street, P. O. Box 165, Chicago, Ill. 60617

Filed Nov. 6, 1975, Ser. No. 629,488
Int. Cl.² B62K *11/10*
U.S. Cl. 280—281 LP **11 Claims**



1. A motorcycle frame comprising:

a pair of frame sections, each comprising an upper and a lower frame tube, said frame sections being situated generally symmetrically about a longitudinal vertical plane located between the frame sections, the tubes of each section being juxtaposed to one another substantially in a parallel run relation at a medial portion of the frame to define the bottom of a passenger compartment, said parallel runs being laterally opposite one another and within a horizontal plane,

a steering post generally centered within said vertical plane and rigidly connected to one end of the frame tubes for retaining a motorcycle front wheel fork,

steering post support portions of said tubes interconnecting the steering post with said parallel runs, said steering post support portions extending rearwardly from the steering post and flaring laterally outwardly and downwardly therefrom,

the upper and lower frame tubes being elongated generally cylindrical members,

the upper frame tube of each frame section having a larger diameter than its respective lower frame tube of the same frame section,

the upper and lower frame tubes of each frame section vertically diverging rearwardly of the parallel runs and converging back together to define an engine compartment located behind the passenger compartment and mostly above the horizontal plane, said tubes being rigidly connected at the point of convergence, and

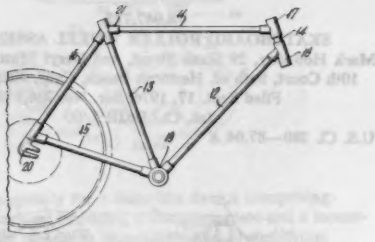
at least one frame cross member laterally spanning the motorcycle frame rearwardly of the steering post support portions and fastened to at least one tube of each frame section.

4,047,731

BICYCLE FRAME

Richard L. VanAuken, Bridgewater, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 10, 1976, Ser. No. 721,979
Int. Cl.² B62K *3/04*
U.S. Cl. 280—281 B **6 Claims**



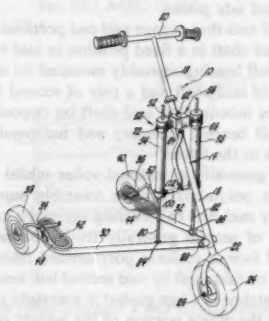
1. A bicycle frame comprising a plurality of tubular elements interconnected to form a generally diamond shaped structure including a head tube, a seat tube, a down tube, a top tube, two seat stays and two chain stays, said head tube, seat tube, down tube having a metal core and a fiber-reinforced plastic skin on the surface thereof at least half of the fibers of which are oriented at an angle of $\pm 45°$ with respect to the longitudinal axis of the tube, and said top tube having a metal core and a fiber-reinforced skin bonded to the surface thereof, said fibers in said top tube being oriented at an angle of about 0° to $\pm 10°$ with respect to the longitudinal axis of the core, and said seat stays and chain stays having a tubular metal core and a fiber-reinforced skin bonded to the surface thereof, said fibers being oriented at an angle of about 0° with respect to the longitudinal axis of the tubular core.

4,047,732

CAMBERING VEHICLE WITH HYDRAULIC STABILIZER AND EQUALIZER

Jerry K. Williams, Sterling Heights, and Franklin D. Landmesser, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 26, 1976, Ser. No. 744,968
Int. Cl.² B60G *19/06*
U.S. Cl. 280—287 **2 Claims**



1. A cambering vehicle comprising a main steering frame, right and left trailing arms extending rearwardly from said main frame, forward pivot connection means pivotally connecting one end of each of said arms to said main steering frame so that said trailing arms may swing on said forward pivot connection means, an equalizer and stabilizer system interconnecting said trailing arms and said main steering frame

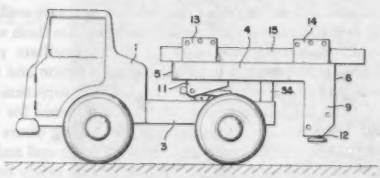
to normally support said main steering frame at a predetermined rake angle with respect to a support surface and to provide for the equal and opposite movement of said trailing arms under predetermined vehicle operating conditions, front contact means steerably mounted to said main steering frame, manual steering means connected to said front contact means, and a rear contact means for each of said trailing arms mounted at the rearward portions thereof, foot rest means on each of said trailing arms to receive the feet of a vehicle operator so that an operator can stand on the vehicle and naturally camber the vehicle while the vehicle is moving, said equalizer and stabilizer system comprising left and right hydraulic cylinders, connector means connecting each of said cylinders to said main frame, a piston and piston rod assembly operatively mounted in each of said cylinders, said piston rods extending generally downwardly from said respective cylinders, pivot means connecting each said piston rod to a respective trailing arm, a hydraulic control for said cylinders comprising hydraulic fluid passage means interconnecting said cylinders so that said trailing arms are forced by the hydraulic fluid in said system to move in equal and opposite directions when said vehicle is cambered, and valve means hydraulically connected in said fluid passage means to condition said system for a hydraulic lock condition and to thereby hold said trailing arms and said main steering frame stationary for vehicle parking, and further to selectively hydraulically interconnect said cylinders so that said trailing arms can be moved to a folded position with respect to said main frame and subsequently be hydraulically locked for vehicle stowage.

4,047,733

FIFTH WHEEL CARRIER HOIST

Alvin G. Parkes, Wingate, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 12, 1976, Ser. No. 657,365
Int. Cl.[2] B60P *3/06;* B62D *53/04*
U.S. Cl. 280—402 **1 Claim**



1. A fifth wheel carrier hoist for a towing vehicle for towing heavy vehicles, said towing vehicle having a chassis frame, said carrier hoist comprising

a hoist frame comprising a substantially planar member having front and rear opposite ends and top and bottom substantially planar surfaces and a pair of extending members comprising a pair of spaced substantially parallel members extending from the bottom surface at the rear end of the planar member substantially perpendicular to said bottom surface, each of the pair of extending members having holes formed therethrough for accommodating pin means adapted to be removably inserted via selected holes thereof supporting a boom via each of said extending members;

mounting means pivotally mounting the planar member of the hoist frame to the chassis frame at the bottom surface at the front end of said planar member is a manner whereby the extending members extend beyond and to an area beneath said chassis frame;

jack means affixed to the planar member of the hoist frame at the bottom surface at the rear end thereof substantially equidistantly from the extending members and extending perpendicularly from said bottom surface for pivotally moving the hoist frame about the mounting means thereof;

a variable length boom; and

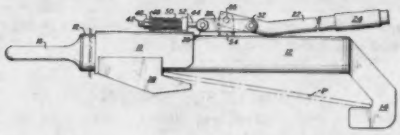
a pair of boom securing means extending substantially perpendicularly from the top surface of the planar member in the areas of the front and rear ends of said planar member for selectively releasably securing the boom at one of the boom securing means or both of said boom securing means, each of the pair of boom securing means comprising a pair of spaced substantially parallel plates straddling the boom and having holes formed therethrough, and pin means adapted to be removably inserted via selected holes of the pair of spaced plates thereby restraining said boom between said plates.

4,047,734

TOW BAR ASSEMBLY

Ray P. Miles, Macedonia, Ohio, assignor to Copperloy Corporation, Cleveland, Ohio

Filed Feb. 23, 1976, Ser. No. 660,584
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—486 **1 Claim**



1. A tow bar assembly adapted to engage a flat member disposed on the forward portion of a vehicle to be towed and the back portion of a towing vehicle comprising a horizontal longitudinal bar member having eye hook means at its front end adapted to engage said back portion of said towing vehicle and first open jaw hook means at the opposite end thereof adapted to engage the rear portion of said flat member; sliding lock means adapted to travel along said bar member provided with second open jaw hook means adapted to engage the front portion of said flat member, said first and second jaw hook means disposed below said horizontal bar member, pad eye member disposed on said lock means, rod means slidably engaged in and extending through said eye member having a forwardly disposed adjustable screw member; compression spring means encircling said rod means biased between said eye member and said adjustable screw member; lever means having an end thereof pivotally disposed on lug means on said bar member; link means pivotally connected between the rear of said rod means and said lever means, said link means pivotally connected to said lever means adjacent said pivotal lever end; whereby when said eye hook means is engaged to said back portion of said towing vehicle, said first and second open jaw hook means can initially engage said flat member of said towed vehicle, and whereby said lever means can compress said spring means thereby moving said first jaw hook means firmly against said flat member, and upon adjustment of said adjustable screw member to provide flexible locking engagement of said first and second jaw hook means with said flat member.

4,047,735

SKI HAVING A PATTERNED TOP COVERING

Rudolf Ferch, Salzburg, Austria, assignor to Fischer Gesellschaft m.b.H., Ried im Innkreis, Austria

Filed June 8, 1976, Ser. No. 693,794
Claims priority, application Austria, June 12, 1975, 4522/75
Int. Cl.[2] A63C *11/14*
U.S. Cl. 280—610 **1 Claim**

1. In combination with a snow ski having a lower running surface and a smooth upper surface, the improvement comprising a patterned top covering comprised of plural elongated sheets of plastic material having a thickness of about 0.3 to 1.5 millimeters, said plural sheets being colored throughout in different colors and arranged in succession longitudinally of

said ski, adjacent sheets having mating edges such that said sheets are disposed in direct juxtaposition with each other

throughout the length of the ski, and means for adhering said sheets to said upper surface of said ski.

4,047,736

VEHICLE SUSPENSION

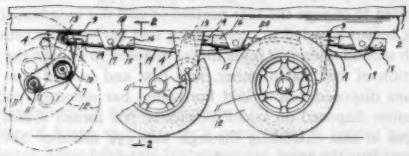
Léonel Prive, 683 Sacre-Coeur Street, Alma, Lac St. Jean County, Quebec, Canada

Claims priority, application United Kingdom, Dec. 24, 1974, 55,825

Filed Dec. 22, 1975, Ser. No. 643,210

Int. Cl.² B60G *11/26*

U.S. Cl. 280—683 **1 Claim**



1. A vehicle suspension for supporting an elongated vehicle chassis having a longitudinal axis on at least two pairs of ground-engaging wheels, each having a wheel axle, the wheels of each pair located on both sides of the vehicle, the wheel axles of said pairs disposed side by side transversely of the longitudinal axis of the vehicle, comprising a suspension system for each wheel axle, each of said suspension systems comprising a first support member secured to, and extending, underneath said vehicle chassis, an L-shaped crank arm having two legs making an acute angle therebetween pivoted to said first support member at the junction of said two legs about a first horizontal pivot axis, said wheel axle carried by the other end of one leg of said crank arm, the other leg of said crank arm upstanding from said first pivot axis, a second support member secured to, and extending, underneath said vehicle chassis, a hydraulic cylinder and piston unit having its cylinder pivotally carried by said second support member about a second pivot axis and having a piston rod pivotally connected to the outer end of said other leg of said crank arm about a third pivot axis, said first, second and third pivot axes being parallel to the wheel axle, the straight line connecting the second and third pivot axes making a small angle with the plane of the vehicle chassis, flexible conduit means interconnecting the head ends of the cylinders of all the cylinder and piston units on one side of the vehicle chassis, separate flexible conduit means connecting the head ends of the cylinders of all the cylinder and piston units on the other side of the vehicle chassis and independent of the flexible conduit means on the first-named side of the vehicle chassis, all the wheel axles on one side of the vehicle chassis being independent of the wheel axles on the other side of the vehicle chassis, upward movement of a wheel axle on one side of the vehicle chassis causing retracting movement of the cylinder rod of the associated cylinder and piston unit and transfer of the hydraulic fluid from said last-named unit to the head end of the cylinders of all the other units on the same side of the vehicle chassis and consequent movement of the piston rods of said other units and consequent lowering of the wheel axles associated with said other units, any upward impact exerted by the wheels being transmitted to the vehicle chassis longitudinally of the latter by the force transmitted through the cylinder piston unit along its longitudinal axis.

4,047,737

SEAT BELT SYSTEM FOR MOTOR CARS

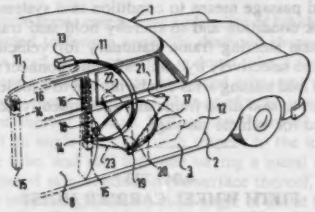
Alfred Grossbach, Lindenstrasse 42, Tamm/Wttbg, Germany

Filed July 16, 1975, Ser. No. 596,293

Claims priority, application Germany, July 19, 1974, 2434748; July 4, 1975, 2529811

Int. Cl.² B60R *21/10*

U.S. Cl. 280—745 **9 Claims**



1. In a seat belt system particularly for motor vehicles having doors which open and close by movement thereof forwardly and rearwardly of said vehicle, said vehicle comprising a vehicle body including a side wall, said vehicle body having a front, a back and a center spaced between said front and back, at least one sliding door mounted on said side wall of said vehicle body and movable from a closed position flush with the side wall of said vehicle body to an intermediate position parallel with and spaced from the closed position and then to an open position spaced in the longitudinal direction of the vehicle from the intermediate position, and means for mounting said door to said vehicle, each of said sliding doors having an inner side with the inner side having a front end and a rear end, the improvement comprising at least one safety belt having a first end mounted to a center portion of said vehicle body and a second end mounted to the inner side of said sliding door, with said at least one safety belt extending freely in an unrestrained condition continuously from said first end to said second end, means mounting said first end of said at least one safety belt to the center portion of said frame, and means for mounting said second end of said at least one safety belt to the inner side of said sliding door, said means for mounting said second end being actuated by sliding movement of said door to move said second end of said at least one belt to a first belt position to dispose said safety belt in orientation permitting ingress and egress of a passenger into and out of said vehicle when said door is in said open position, and to a second belt position to dispose said belt to actively restrain a passenger in said vehicle when said door is moved to said closed position, said at least one safety belt consisting of a shoulder safety belt, and a pelvis safety belt having a first end connected to a center portion of said vehicle body and a second end connected to said inner side of said sliding door, means for mounting said second end of said pelvis safety belt to the inner side of said sliding door, and means for mounting said first end of said shoulder safety belt to the center of the vehicle body also mounting said first end of said pelvis safety belt to the center of the vehicle body, said means for mounting said second end of said pelvis safety belt comprising a pivotal lever pivotal about an axis lying at an angle to the vertical plane of said sliding door, said pivotal lever having a first angular extension extend-

ing from one end thereof, and a second angular extension extending from the other end thereof, said pivotal lever being pivotal about said first angular extension while said second angular extension fixedly mounts thereon said second end of said pelvis safety belt.

4,047,738

RECORD SHEETS SENSITIZED WITH REDUCED CHARGE MONTMORILLONITE PIGMENT

Peter A. H. Isaac, Summit, and T. Dixon Oulton, Watchung, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Continuation-in-part of Ser. No. 648,253, Jan. 12, 1976. This application Apr. 5, 1976, Ser. No. 673,595

The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.

Int. Cl.[2] B41L *1/36*; B41M *3/12*

U.S. Cl. 282—27.5 **15 Claims**

1. Record material for forming a colored image having increased resistance to fading upon contact with a solution of an electron-donating colorless or substantially colorless dye precursor compound, comprising a support member having distributed throughout a recording area thereof finely divided particles of mixed layer smectite, the lattice of which is partially dioctahedral montmorillonite and partially trioctahedral such as saponite or hectorite, and wherein the proportion of trioctahedral is small, said mixed layer smectite having been subjected to ion-exchange treatment with lithium ions followed by heat treatment to collapse irreversibly the dioctahedral montmorillonite structure.

4,047,739

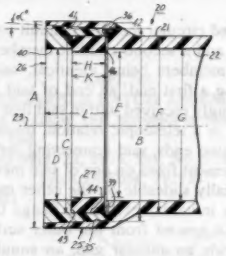
FITTING AND METHODS FOR MAKING THE SAME

W. Sidney Aitken, 10040 Benares Place, Sun Valley, Calif. 91352

Continuation-in-part of Ser. No. 388,071, Aug. 13, 1973, abandoned. This application May 12, 1975, Ser. No. 576,278

Int. Cl.[2] F16L *13/02*

U.S. Cl. 285—21 **27 Claims**



1. A fitting comprising a body having a flow passage therethrough; a socket member on said body having an opening, a central axis, a peripheral socket abutment wall, and a peripheral socket sidewall in said opening; a ring-like hub member in said opening, said hub member having a peripheral hub abutment wall, a peripheral ring groove face, and a hub sidewall; a peripheral ring groove bottom surface on one of said members facing inwardly toward said central axis and adjacent to the said ring groove face; said members being made of a thermoplastic material, which material is fusible to like material by motion fusion, said abutment walls extending non-parallel to the axis, and being joined together solely by fusion of the surface materials of the abutment walls, all radial dimensions of the socket member from the socket sidewall to and including the opening end of the socket member being greater than any radial dimension of the hub member, there being no radial overlap of the hub member by any part of the socket member at said end of the socket member; and a resilient sealing ring in the ring groove formed by the ring groove face and ring groove bottom surface.

27. The method of assembling a ring-shaped hub member of a fitting in a circular opening in a socket member comprising pressing an abutting wall of each member against the other with a resilient ring placed in a ring groove that is contiguous to both abutting walls, said ring groove having an edge adjacent to both of said abutting walls which forms a peripheral reservoir, and generating heat by means of motion fusion, whereby to fuse the members together at said abutting walls and to discharge slag from the joinder into said reservoir, the wall thickness of the hub member at the point of fusion being greater than the wall thickness of the socket member, whereby distortion of the socket member as a consequence of the heat is minimized.

4,047,740

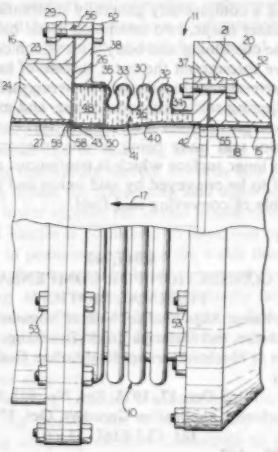
INTERNALLY INSULATED BELLOWS ASSEMBLY

D. Craig Young, and Abraham L. Zadoks, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 1, 1976, Ser. No. 691,747

Int. Cl.[2] F16L *51/02, 59/14*

U.S. Cl. 285—47 **4 Claims**



1. An internally insulated bellows assembly for providing a flexible transistion in a high temperature fluid pressure system, comprising:

an annular bellows having first and second end portions;

cylindrical shield means concentrically spaced entirely within the bellows for forming an annular cavity therebetween, the shield having first and second ends adjacent the first and second ends of the bellows;

a first mounting portion connected to adjacent first ends of the bellows and shield and defining a closed first end of the cavity;

a second mounting portion connected to a second end of the bellows:

an insulating ring member engaging and interconnecting adjacent second ends of the bellows and shield and defining a closed second end of the cavity; and

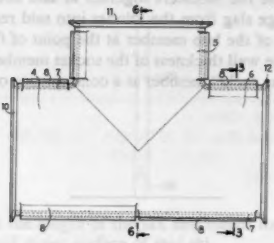
insulating material disposed within the cavity.

4,047,741

COMPOSITE REINFORCED PIPE UNION

Jean-Pierre Felix Pertriaux, Paris, France, assignor to Pont-A-Mousson S.A., Nancy, France

Continuation of Ser. No. 463,024, April 22, 1974, abandoned. This application Dec. 2, 1975, Ser. No. 636,870
Claims priority, application France, June 22, 1973, 73.23019
Int. Cl.[2] F16L *9/14*
U.S. Cl. 285—55 11 Claims



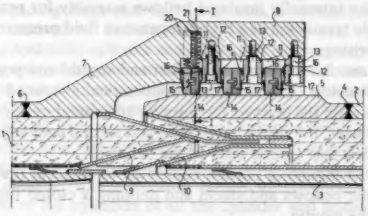
1. A reinforced composite pipe union comprising in permanent combination : a body defined by a body wall of substantially constant thickness and comprising web means of glass fibres embedded in a thermosetting plastics material in the thermoset condition, said body comprising at least two tubular end pipe portions for respectively receiving ends of at least two pipes to be united by the union, the end pipe portions meeting at an angle in an intermediate part of the union and each having a continuously generally substantially cylindrical outer and inner shape, two assembled metal half-shells constituting a case containing said body with which case said body is co-extensive throughout the outer surface of said body, a film of an adhesive material interposed between said body and said case for adhering said body to said case, and means at ends of said end pipe portions for the fixing of said ends of said pipes to the union, said body being in one inseparable piece and defining an inner surface which is continuous and impervious to the fluid to be conveyed by said union and said pipes so as to be capable of conveying said fluid.

4,047,742

PIPE CONNECTION FOR COMPENSATION OF THERMAL MOTION

Dirk Haferkamp; Alija Hodzic, both of Mannheim; Eike Paetz, Ludwigshafen, and Heinrich Stach, Ilvesheim, all of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Mannheim, Germany

Filed Oct. 17, 1975, Ser. No. 623,345
Claims priority, application Germany, Oct. 17, 1974, 2449430
Int. Cl.[2] F16L *55/00*
U.S. Cl. 285—187 5 Claims



1. A joint for high temperature and high pressure conduits comprising:

a first hollow ring holding member comprising a pressure housing extending from a first conduit member and surrounding a second hollow bushing like member comprising a gas conduit housing extending from a second conduit member and defining a space between said first and second hollow members;

at least one annular groove in said first hollow member opening toward said space;

at least one ring disposed in each groove and extending into said space in sealing relationship to said first and second hollow members, said ring including a plurality of segments separate from and contiguous with each other;

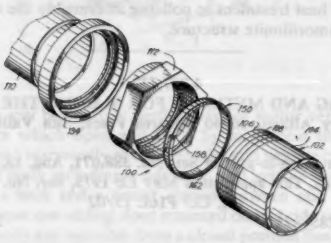
a plurality of separate helical springs disposed radially from said annular groove in said first hollow member coupled with each ring and biasing each ring segment radially inward in sealing relationship to said second hollow member; whereby said segmented rings compensate for axial and radial motion of said members due to temperature variations therein.

4,047,743

LIGHT WALLED CONDUIT

Burton L. Weintraub, Old Bethpage, and Salvatore Buda, Maspeth, both of N.Y., assignors to Berger Industries, Inc., Maspeth, N.Y.

Continuation-in-part of Ser. No. 464,121, April 25, 1974, abandoned, which is a continuation of Ser. No. 246,384, April 21, 1972, abandoned. This application Apr. 3, 1975, Ser. No. 564,823
Int. Cl.[2] F16L *17/06*
U.S. Cl. 285—340 5 Claims



4. A light walled circular metallic conduit comprising a first conduit member and a second conduit member, said first and second conduit members being identical, said first conduit member including a first end, an end of said second conduit member being snugly received within said first end of said first conduit member in a telescopic relation, means mechanically connecting said two ends, said connecting means including a male threaded element fixed on one of said members and a nut rotatable and axially slideable on the other member, said nut having a radially inwardly extending flange the free edge of which is near but spaced from the outer surface of the one member to provide an annular gap, an annular member between the end of the one conduit member and the flange, said annular member being squeezed between the flange and the end of the one conduit member when the nut is tightened on the threaded element, and an elastomeric skirt functionally unitary with the nut, said skirt including a retroverted lip of diminishing thickness extending into and filling said gap to form a water-tight seal thereat.

4,047,744

LOCKABLE GAS TANK CAP DEVICE

Richard C. McNeary, Forrest City, Ark., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

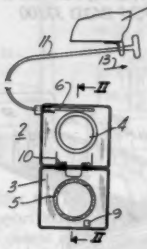
Filed May 3, 1976, Ser. No. 682,480
Int. Cl.[2] B65D *55/14, 43/16*
U.S. Cl. 292—171 2 Claims

1. A lockable gas tank device for releasably locking the open end of a gasoline tank of a vehicle, said gas tank cap device comprising

a cover hingedly affixed to a vehicle in the area of the open

end of the gasoline tank thereof in a manner whereby it covers said open end in a closed position and is free from said open end in an open position, said cover having a pair of first and second spaced parallel edges and a third edge perpendicular to and joining the first and second edges;

a loop-type projection extending from the inside of the cover adjacent the third edge and spaced from the first and second edges, said projection being at least twice the distance from the first edge that it is from the second edge;



a spring-biased pin biased by a spring and slidably mounted on the vehicle in proximity with the cover for locking the cover in closed position under the force of the spring, the pin being closely adjacent and parallel to the third edge of the cover and extending across the cover from the first edge of the cover into the projection in closed position; and

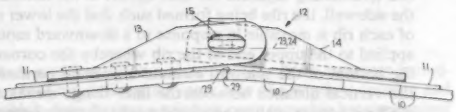
cable means affixed to the pin and extending into the vehicle for moving the pin out of the projection against the force of the spring to release the cover for movement to its open position.

4,047,745

RELEASABLE LATCH ASSEMBLY

Joseph H. Krenz, Warsaw, Ind., assignor to Sun Metal Products, Inc., Warsaw, Ind.

Filed Sept. 22, 1976, Ser. No. 725,469
Int. Cl.² E05C *19/18*
U.S. Cl. 292—302 **10 Claims**



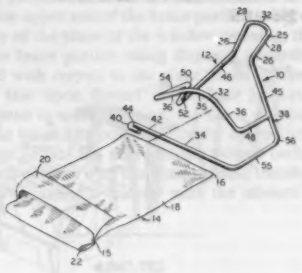
1. A latch assembly for releasably connecting adjacent parts together in an angular relationship, comprising a pair of latch elements each of which includes a base plate and at least one flange expending perpendicularly thereto, said flanges having openings elongated along lines respectively sloping toward planes containing said base plates and toward free ends of said flanges, said flanges overlapping at said free ends with said openings in axial alignment, said lines of said openings being coincident when said base plates are disposed at an angle to one another, and a releasable pin member extending through said aligned openings, said pin member having a cross-sectional width extending along said coincident lines, whereby forces tending to separate said latch elements along said coincident lines are strongly resisted by said pin member.

4,047,746

ANIMAL WASTE REMOVING DEVICE

Stanley P. Radowski, 8410 Escanaba Ave., Chicago, Ill. 60617

Filed Jan. 5, 1977, Ser. No. 756,830
Int. Cl.² A46F *13/08*
U.S. Cl. 294—55 **3 Claims**



1. An animal waste removing device, comprising:

a. a frame, and

b. a bag having an open end and a closed end with a body portion therebetween and adapted to be removably supported by said frame with said open end adapted to receive therein the animal waste,

c. said frame including:

1. a handle at one end thereof including a pair of handle elements joined together at one end thereof,
2. an upper support rail extending transversely to said handle and having a concave configuration with one side of the open end of said bag draped thereon in supported position,
3. a lower support rail extending in substantially a horizontal plane in spaced relationship to said upper rail and transversely to said handle for supporting the other side of said open end of said bag with said body portion extending rearwardly thereof towards said handle,
4. coupling means for connecting said upper support rail and said lower support rail to said handle elements, such that said handle is positioned to have said open end of said bag in position to receive the waste therein,
5. said coupling means includes a pair of downwardly extending arms connected respectively at one end thereof to said handle elements, and a first leg and a second leg, each said leg connected at one end thereof to said arms, and at the other end thereof to each end of said upper support rail,
6. said second leg includes a substantially vertically extending leg portion and a substantially horizontally extending coupling member connected to said upper support rail at one end thereof such that said bag is adapted to be removed between the space defined between said coupling member and said lower suppport rail,
7. a lower connecting element extending rearwardly from one end of said lower rail and connected to one of said arms to maintain said frame in a planar surface with said bag mounted thereon, said arms converge outwardly from said handle elements to provide the spacing for defining the open end of said bag, and
8. said first leg and said lower connecting element extend forwardly from one of said arms and are in substantially vertically spaced relationship to each other, and

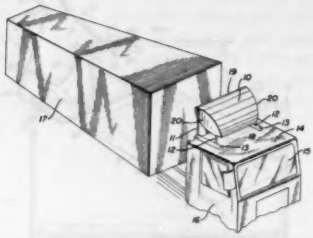
d. means for retaining said bag in releasably fixed position to said lower rail, said means includes a finger at one end thereof extending in parallel spaced relationship to said lower rail to define a groove therebetween adapted to receive therein one end of said open end of said bag.

4,047,747

AIR DRAG REDUCER FOR MOTOR FREIGHT VEHICLES

Charles James Beers, Bradenton, Fla., assignor to LDV Industries, Inc., Bradenton, Fla.

Filed Dec. 11, 1975, Ser. No. 639,882
Int. Cl.² B60J 9/04
U.S. Cl. 296—1 S **1 Claim**



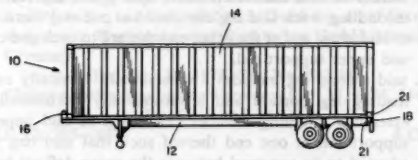
1. Apparatus for reducing air drag on highway trucks and truck tractor-semitrailer combination vehicles which have closed van type bodies, said apparatus comprising: a rigid airfoil with a smooth slightly convex upper front surface and a very convex lower rear surface, straight leading and trailing edges, with the leading edge being shorter than the trailing edge, said trailing edge being as a minimum three-fourths as long as the closed van type body is wide, said airfoil having smoothly rounded tips; an assemblage of struts and plates which secure the airfoil adjustably above the cab roof of the vehicle, holding the airfoil so that its leading and trailing edges are perpendicular to the centerline of the vehicles cab, the plates being attached to the cab roof and the struts defining a gap between the airfoil and the cab roof, these struts being adjustable in their lengths so that this gap dimension and shape may be changed.

4,047,748

CHASSIS LOCK FOR CONTAINER TRAILER

Robert L. Whaley, and James L. Day, both of Cincinnati, Ohio, assignors to Pullman Incorporated, Chicago, Ill.

Filed June 1, 1976, Ser. No. 691,679
Int. Cl.² B62D 27/00
U.S. Cl. 296—35 A **13 Claims**



1. A chassis lock for locking a trailer chassis to a container body having a locking cavity therein comprising:

a handle,

wall means having a striker angle slot defined therein,

a sleeve fixed to said handle and extending through the striker angle slot,

a striker angle plate secured to the sleeve and shaped so as to fit into the striker angle slot in at least a first and a second rotatably separated positions,

a shaft extension carried at one end within the sleeve end and extending at its other end into the cavity in the container body,

a slip joint connecting the sleeve to the shaft extension, and

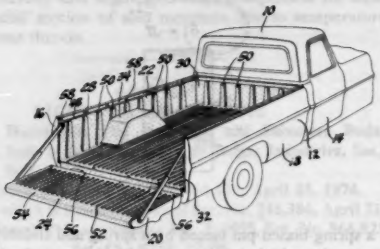
a locking plate of an elongated shape carried by the shaft extension and received within the cavity in the container body such that the container body is secured to the chassis by the locking plate when the sleeve is rotated from the first position wherein the striker angle plate fits into the striker angle slot to the second position.

4,047,749

CARGO BOX LINER FOR PICK-UP TRUCKS

Robert H. Lambitz, and Robert J. Zeffero, both of Fenton, Mich., assignors to Zefflamb Industries, Inc., Fenton, Mich.

Filed June 23, 1976, Ser. No. 699,309
Int. Cl.² B62D 33/00
U.S. Cl. 296—39 R **8 Claims**



1. In combination with a pick-up truck having a cargo box, said box having sidewalls, hollow flanges extending inwardly from the sidewalls and a bottom wall, a cargo box liner comprising:

a molded, plastic, unitary liner body having walls of a substantially uniform thickness including a bottom wall, a forward wall integrally connected to the bottom wall, a pair of spaced sidewalls on opposite sides of the bottom wall, a pair of flexible corners each formed with a radius several times the liner thickness, each corner forming a connection between the bottom wall and the corresponding sidewall, the liner sidewalls forming a rearward opening for receiving an object to a position between the liner sidewalls,

integral, outwardly extending flange means connected to the top of the liner sidewalls and seated on the hollow cargo box flanges in a position in which a major portion of the height of each liner sidewall is spaced inwardly from its respective cargo box sidewall so as to be movable with respect to such cargo box sidewall,

each liner sidewall having a plurality of elongated, parallel, vertical ribs, each rib having an upper end supported adjacent the hollow flange of the cargo box and a lower end terminating adjacent the liner corner at the bottom of the sidewall, the ribs being formed such that the lower end of each rib is movable in response to a downward motion applied to the upper end of the rib whereby the corner at the bottom of the sidewall assumes a position permitting the vertical distance between the liner flange means and the liner bottom wall to accomodate the distance between the top of the cargo box flanges and the cargo box bottom wall.

4,047,750

OVERHEAD GUARD-BATTERY BALLAST

Frank Richard Samide, Chardon, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

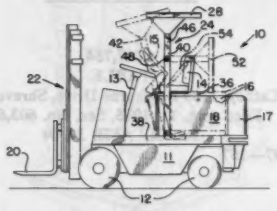
Filed July 19, 1976, Ser. No. 706,345
Int. Cl.² B62D 21/00
U.S. Cl. 296—107 **8 Claims**

1. An overhead guard assembly for industrial vehicles having a frame and a weighted member carried by said frame, the overhead guard assembly comprising:

upstanding support means pivotally secured to said frame, said support means being mounted so as to allow rotation

of said support means about a transverse pivot axis between a first position wherein said support means extend vertically and upwardly of said pivot axis, and a second position wherein said support means extend forwardly and upwardly of said pivot axis;

rigid base means rigidly connected to and extending rearwardly from and perpendicularly to the lower portion of said support means, said base means being disposed be-



neath and under the influence of said weighted member when the support means is disposed in said first position and said base means extending upwardly and rearwardly of the transverse pivot axis when said weighted member is lifted from said frame and the support means is disposed in said second position; and,

a guard surface secured to the upper end of said support means.

4,047,751

ROOF RAIL WEATHERSTRIP FOR MOTOR VEHICLE

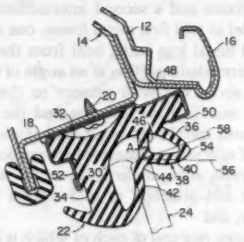
Shyouichi Koike, Seki, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Aug. 13, 1975, Ser. No. 604,446

Claims priority, application Japan, Aug. 14, 1974, 49-977110[U]; Dec. 12, 1974, 49-150873[U]; Mar. 7, 1975, 50-30951[U]

Int. Cl.² B60J *1/17*

U.S. Cl. 296—146 **7 Claims**



1. A weatherstrip in a motor vehicle body structure including a roof rail defining an upper side of a window opening and a vehicle door having a window pane movable between raised and lowered position relative to the window opening, comprising:

an elongated hollow resiliently deformable member having

a. a mounting portion secured to the roof rail;

b. an inner side portion extending substantially downwardly from the mounting portion;

c. an arm portion projecting outwardly at an angle from the mounting portion;

d. a web portion extending between the inner side portion and the arm portion;

the mounting portion, inner side portion, arm portion and web portion defining the hollow of the elongated hollow resiliently deformable member;

e. a brace portion disposed in the hollow of the elongated hollow resiliently deformable member;

the transverse thickness of the inner side portion being greater than the transverse thickness of the arm portion or web portion to concentrate the flexure action in the arm portion and web portion;

the web portion having a downwardly bowed outboard lip portion and inboard lip portion;

the brace portion having an upper end connected to the mounting portion and a lower end connected to the web portion, the upper end of the brace portion being disposed outwardly of the plane of the window opening, the lower end of the brace portion being disposed inwardly of the upper end with respect to the plane of the window opening such that upon flexure of the web portion by the window pane in raised position, the brace portion swings toward the inner side portion with the upper end thereof as its hinge to flex the downwardly bowed outboard lip portion into contact with the window pane thereby to bias the window pane into contact with the inboard lip portion.

4,047,752

DECK CHAIR

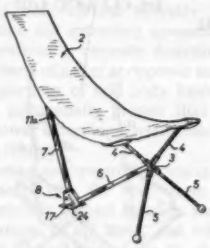
Eduard Rohr, im Birch, 5506 Magenwil, Switzerland

Filed Apr. 28, 1976, Ser. No. 681,147

Claims priority, application Switzerland, May 13, 1975, 6091/75

Int. Cl.² A47C *4/00*

U.S. Cl. 297—19 **8 Claims**



1. A folding deck chair of the kind which when in use rests on a ground surface at essentially three locations, comprising, in combination:

a web of flexible sheet material for providing a combined back and seat surface, having a loop in its normally upper and back end portion for insertion of a cross rod therein for supporting of the upper end of the web and having corner pockets in its normally front and lower end portion for receiving front supports, and

a foldable frame comprising

a spider connector,

a connecting rod rigidly connected to said spider connector,

a rear ground-engaging foot rigidly connected to said connecting rod and thereby spaced from said spider connector, said foot having, for mounting a rear support rod, a horizontal pivot and a portion spaced from said pivot provided with catch features,

a telescopically adjustable rear support rod pivotably connected to said foot by means of a slip joint cooperating with said pivot of said foot and having catch features cooperating with the catch features of said foot and with said slip joint for setting the inclination of said rear support rod at one of a plurality of selectable settings, said respective catch features being of a configuration allowing their release from each other by a pull on said support rod away from said foot actuating said slip joint, the pivotable connection of said rear support rod to said foot being such that said rear support rod can be folded in the folded state of the deck chair, approximately parallel to said connecting rod, the

length of said rear support rod, in its telescopically shortest state, corresponding approximately to that of said connecting rod,

a cross rod detachably insertable in the upper end of said rear support rod in a manner fixed against rotation about the axis of said rear support rod for insertion into said loop of said web for support of said web,

two front support legs disengageably insertable in said spider connector for supporting said connector and thereby the front of the deck chair above the ground, and

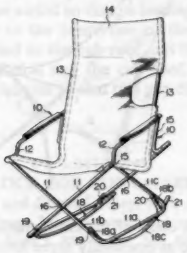
two front strut bars disengageably insertable in said spider connector in respective positions normally extending obliquely upwards from said connector and each having an arm bent at an angle set in its normally upper end for penetrating into one of said corner pockets of said web for support thereof and for availability of its more horizontal part for service as a handle to assist a seated person in getting up,

said spider connector being of such a configuration that in the unfolded and assembled state of the deck chair the connector, front support legs and strut bars form an off-plane X-shape.

4,047,753
FOLDABLE CHAIR WITH ROCKING MEANS

Suekichi Uchida, Aichi, Japan, assignor to Uchida Sharyo Co., Ltd., Nagoya, Japan

Filed Nov. 6, 1975, Ser. No. 629,564
Int. Cl.² A47C *3/02*
U.S. Cl. 297—32 **8 Claims**



1. In a foldable chair of the type including a pair of frameworks, each comprised of pipes and provided with an angular U-shaped leg having front and rear leg sections and a bottom leg section therebetween, pivot pins connecting said U-shaped legs together to permit relative pivotal movement therebetween about said pivot pins for permitting said U-shaped legs to be put into an X-like configuration and to also permit the frameworks to be folded, a flexible seat member stretched on said frameworks, and two rocking means attached to said U-shaped legs, respectively, for rocking the chair,

the improvements wherein:

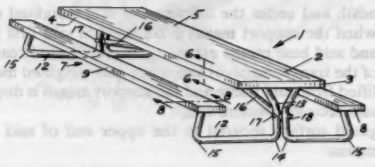
each of said rocking means includes a pipe type rocker member which comprises front and rear portions pivotally connected by pivot pins to the front and rear leg sections of the corresponding U-shaped leg, respectively, and an arcuate portion between said front and rear portions, said rocker members being swingable inwardly of the chair relative to said U-shaped legs between upward and downward positions, said rocking means including means engageable with at least inside portions of the bottom leg sections of the U-shaped legs when they are in said downward position so as to be stopped and retained in said downward position;

said rocker members being pivotally swingable from an upward housed position where said arcuate portion is remote from said bottom leg sections and said chair rests on said bottom leg sections in a non-rocking condition, to a fully swung downward position where said rocker members are engaged with at least inside portions of the bottom leg sections of the U-shaped legs and are stopped and retained in said fully swung downward position with the arcuate portions of said rocker members protruding downwardly from the bottom leg sections, respectively, so that said chair rests on said arcuate portions and is in a rocking condition.

4,047,754
TABLE

Jimmy D. Cathey, 1105 Baythorne Drive, Shreveport, La. 71107

Filed Aug. 11, 1975, Ser. No. 603,617
Int. Cl.² A47B *37/04*
U.S. Cl. 297—157 **8 Claims**



1. A table comprising:

a. A horizontally disposed first metal frame covered with a first metal sheeting;

b. A pair of horizontally disposed second metal frames, each covered with a second metal sheeting, said second metal frames being disposed on either side of, below, and essentially parallel to said first metal frame;

c. Two sets of metal legs, each of said sets being disposed at the opposite ends of and beneath said first metal frame and said second metal frames, each of said metal legs having a first intermediate portion disposed perpendicular to said first metal frame and a second intermediate portion disposed parallel to said first metal frame, one end portion of each of said metal legs being bent from the outer end of said first intermediate portion at an angle of from about 55 degrees to about 65° with respect to the vertical and attached to said first metal frame and the opposite end portion of said metal legs being bent inwardly from the outer end of said second intermediate portion toward said one end portion at an angle of about 10° with respect to the vertical and attached to said second metal frames, respectively; and

d. a pair of braces, one end of each of which is carried by one of said sets of legs and the opposite end of which is carried by said first metal frame.

4,047,755
RESTRAINING MEANS FOR AN INFANT CAR SEAT

Quentin H. McDonald, Scarsdale, N.Y., and Richard L. Panicci, Hanover, Mass., assignors to Quentin H. McDonald, Scarsdale, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,969
Int. Cl.² B60R *21/10*
U.S. Cl. 297—216 **15 Claims**

1. In combination,

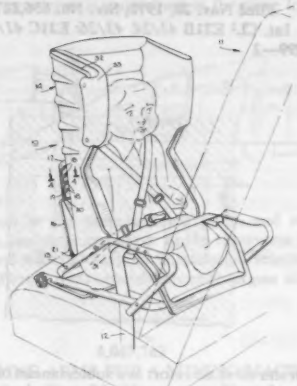
a frame;

a hoop pivotally mounted on said frame;

a seat pivotally mounted on said frame; and

at least one apertured bracket mounted on said seat, said bracket having a plurality of spaced apart positioning slots for selectively receiving said hoop therein, each said slot

including at least two portions angularly disposed relative to each other to define a corner and means in one of said



portions for releaseably holding said hoop at one end of said one portion.

4,047,756

CHAIR CONSTRUCTION AND METHOD OF ASSEMBLING THE SAME

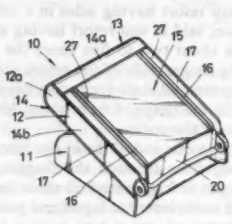
David Marshall Ney, St. Ives, Australia, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 1, 1975, Ser. No. 618,627

Claims priority, application Japan, Oct. 18, 1974, 49-120632; Oct. 18, 1974, 49-120633

Int. Cl.[2] A47C *27/00*

U.S. Cl. 297—219 **3 Claims**



1. In a chair construction having a seat with a top, a bottom, a front end, a rear end and a pair of opposing sides; and a back rest with a front, a rear, a top end, a bottom end and a pair of opposing sides, the improvement which comprises a covering of sheet material extending over the front, top end and opposing sides of said back rest, said covering having elongated marginal strip areas of sheet material extending partially over the rear of said back rest and defining an opening accommodating the fitting of said covering upon the back rest; a flap of sheet material extending in adjoining relation to said strip areas and over the rear of said back rest to cover said opening, and at least one slide fastener connected to adjoining edge portions of said strip areas and flap to secure same together closing said opening, said strip areas, flap and slide fastener defining a pair of tail pieces extending beyond the rear of the back rest and foldable against the bottom end thereof, each tail piece bearing a terminal end of said slide fastener; and a piece of sheet material secured against the bottom end of the back rest in overlying relation to said tail pieces.

4,047,757

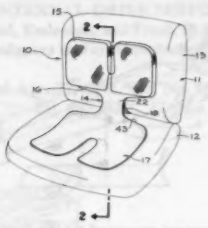
SEATING STRUCTURES WITH FLEXIBLE BACKS

Loren W. Eames, 4233 N. Peck Road, El Monte, Calif. 91723; Joseph A. Berg, 22325 De Kalb Drive, Woodland Hills, Calif. 91364, and Thomas W. McAllister, 19301 Caladero St., Tarzana, Calif. 91356

Filed May 3, 1976, Ser. No. 682,583

Int. Cl.[2] A47C *7/40*

U.S. Cl. 297—230 **18 Claims**



1. A seating device comprisingly:

a seat back body which has sufficient stiffness to support the back of a user but is rearwardly flexible to conform to movements of the user's back;

said body having a lower mounting portion extending upwardly at the center of the user's back, and having two upper portions both carried movably by said lower mounting portion and extending upwardly and laterally outwardly therefrom in opposite directions respectively to support the back of a user at opposite sides of the spine;

said two upper portions of said body having a combined overall width substantially greater than the maximum width of said lower mounting portion between two opposite side edges thereof;

said body containing an upwardly opening slit which extends downwardly into the body from an upper end thereof, at a laterally central location and between said two upper portions of the body, and which terminates downwardly at a lower end of the slit above said lower mounting portion of the body;

said body having two flexible connector portions joining said two upper portions of the body respectively with said lower mounting portion thereof and extending between said lower end of said slit and the upper extremities of said opposite side edges of said lower mounting portion;

said device being constructed at the location of said slit to avoid support of a user's back along the spine, from the upper end of said slit downwardly to approximately said lower end of the slit, and to thereby allow the spine to project rearwardly farther than do laterally adjacent portions of the user's back which are supported by said two upper portions of said body.

4,047,758

ADJUSTABLE DENTAL RECLINER

Kenneth Jack Whitehill, 481 Forest Ave., Palo Alto, Calif. 94301

Filed Feb. 23, 1976, Ser. No. 660,228

Int. Cl.[2] A47C *3/00*

U.S. Cl. 297—284 **30 Claims**

1. An apparatus for supporting an occupant in a generally reclining position, comprising:

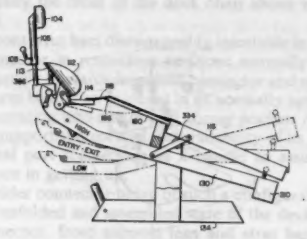
a generally elongated carriage having a head end and a foot end;

a shoulder support mounted to pivot about a first horizontal axis disposed above said carriage and generally perpendicular to the longitudinal dimension thereof near the head end thereof for supporting at least the occupant's shoulders;

an upper body support mounted to said shoulder support to

pivot about a second horizontal axis parallel to and generally above said first horizontal axis for supporting at least the occupant's upper body the relative relationship of said first and second axes allowing an occupant to readily sit up from a supine position;

a headrest assembly lockably pivotally mounted to the head end of the carriage for supporting the occupant's head;



a lower body support mounted to the foot end of the carriage for supporting at least the occupant's legs;

a middle body support positioned between the upper body support and the lower body support for supporting the middle body of the occupant, said middle body support accommodating the contour of the lower back region and hip region of the occupant, and

base means for supporting the carriage.

4,047,759

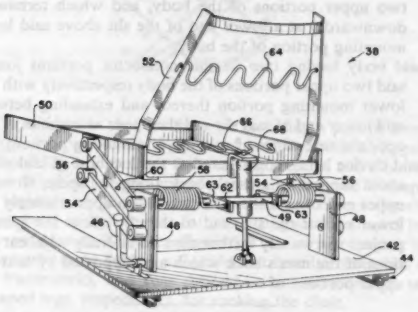
COMPACT SEAT SUSPENSION FOR LIFT TRUCK

Daniel P. Koscinski, Chardon, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed July 9, 1976, Ser. No. 703,996

Int. Cl.[2] A47C *3/22, 3/30*

U.S. Cl. 297—346 **13 Claims**



1. In a lift truck vehicle having a mast assembly, a carriage for lifting loads, and an operator's station, a seat assembly comprising; a seat, a base component mounted on a seat supporting surface, a pair of spaced apart upright components affixed to and extending normally from said base component, lower seat components, at least one pair of parallel disposed link components connected between said lower seat components and said upright components, said link components being located outboard of said seat so as to allow said seat to move in close proximity to said seat supporting surface, shaft means extending between and connected to said pair of upright components, and spring means connected to said shaft means to apply force to one of said at least one pair of link components for urging said lower seat components away from said base component.

4,047,760

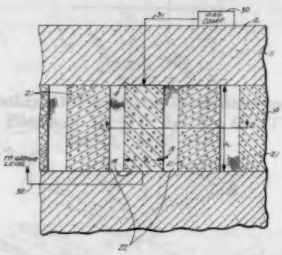
IN SITU RECOVERY OF SHALE OIL

Richard D. Ridley, Grand Junction, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Filed Nov. 28, 1975, Ser. No. 636,227

Int. Cl.[2] E21B *43/24, 43/26;* E21C *41/10*

U.S. Cl. 299—2 **20 Claims**



1. An in situ oil shale retort in a subterranean oil shale formation comprising:

a cavity in the subterranean oil shale formation having sides and containing a zone of fragmented oil shale formation having a void fraction in the range of from about 10 to 25 percent of the volume of the zone of fragmented oil shale formation, the cavity having an approximately rectangular horizontal cross section and a height in the range of from about two to five times the horizontal dimension of the longest side of the cavity;

means for introducing gas at the top of the cavity for advancing a retorting zone downwardly through the zone of fragmented oil shale formation in the cavity, wherein kerogen in fragmented oil shale formation in the retorting zone is converted to liquid and gaseous products; and

means for recovering liquid and gaseous products from the bottom of the cavity.

14. A method for retorting oil shale in situ comprising the steps of:

forming an in situ retort having sides in a subterranean oil shale formation, said in situ retort having a height in the range of from about two to five times the horizontal dimension of the longest side of the retort and containing a zone of fragmented oil shale formation having an average void fraction in the range of from about 10 to 20 percent of the volume of the zone;

introducing a gas in one end of the in situ retort for advancing a retorting zone through the fragmented oil shale wherein kerogen in fragmented oil shale formation in the retorting zone is converted to liquid and gaseous products; and

recovering the liquid and gaseous products at the other end of the in situ retort.

4,047,761

MINING MACHINE

Edward Gordon Coupe, Newark, England, assignor to Dosco Overseas Engineering Limited, England

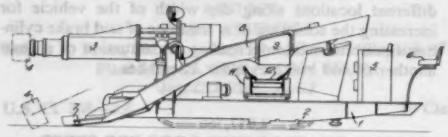
Filed Sept. 5, 1975, Ser. No. 610,673

Int. Cl.[2] E21C *35/20*

U.S. Cl. 299—64 **12 Claims**

1. A mining machine particularly constructed for use in cutting a roadway at an end of a working face, said mining machine having a front and back and comprising a cutting head; mounting means for said cutting head including means for moving said cutting head forwardly against a working face to be cut; means for conveying mined material towards the back of the machine; a discharge conveyor extending in a direction transverse to the front-back longitudinal direction of said mining machine; said discharge conveyor having at least one discharge end and mounting means mounting the dis-

charge conveyor on the mining machine for relative movement of said discharge end and said cutting head in the front-back longitudinal direction whereby the cutting head may be advanced towards the working face while the discharge end of the discharge conveyor is maintained in the same location to



unload material at the same selected point, and means for extending the discharge conveyor in the transverse direction whereby mined material may be unloaded at selected points disposed at different transverse distances from one side of said machine.

4,047,762

GATHERING ARMS FOR A MINING MACHINE

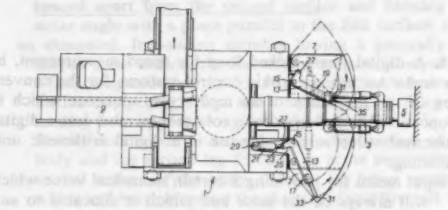
Kenneth Bamford, East Markham, near Newark, and John Roger Clowes, Mansfield, both of England, assignors to Dosco Overseas Engineering Limited, England

Filed Mar. 24, 1976, Ser. No. 669,835

Claims priority, application United Kingdom, Apr. 14, 1975, 15225/75

Int. Cl.² E21C *35/20*

U.S. Cl. 299—64 **8 Claims**



1. A mining machine comprising a cutting head, a forwardly extending apron located beneath said cutting head, a discharge conveyor associated with said apron, and at least one gathering arm having a first end for pivotal connection to the machine, a first hydraulically operated device pivotally connected to the arm for sweeping said arm through a substantial arc between a first position and a second position, and a second hydraulically operated device supported on said arm for extending and retracting said arm so that it can be extended for sweeping from said first position to said second position and can be retracted again prior to sweeping back from said second position to said first position and a hydraulic control system for controlling the sweeping and extension of said gathering arm, the system including a pump, a main control valve, a first detent valve movable between a first position, for extending said arm and for sweeping said arm from a first to a second position, and a second position for retracting said arm and for sweeping said arm back to its said first position under the control of a second detent valve, said first detent valve, when in its first position, supplying fluid to said second arm extending and retracting device to move it to an extended position, a first sequence valve operative, on movement of said device to its extended position, to permit passage of fluid to said first device to move it from said first position to said second position, a second sequence valve operative, on movement of said first device, to said second position to permit passage of fluid to said second detent valve controlling the position of said first position to its second position, whereupon fluid will be directed to said second arm extending and retracting device to move the latter from its extended position back to its retracted position, a third sequence valve subsequently allowing passage of fluid to the first said device to return it from its second position to its first position, and a fourth sequence valve which will subsequently permit passage of fluid to said second detent valve to move it from its second position back to its first position thereby causing said first detent valve to move back to its first position for a subsequent control cycle.

4,047,763

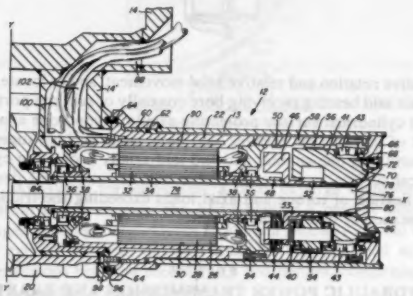
MINING MACHINE WITH CUTTER DRUM HAVING INTERNAL DRIVE MOTORS

James L. Gilliland, Emlenton, and Frank B. Kendrick, Franklin, both of Pa., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Apr. 27, 1976, Ser. No. 680,652

Int. Cl.² E21C *27/24*

U.S. Cl. 299—76 **11 Claims**



1. A mining machine comprising: a mobile support; a boom carried by said support and having an elongated extent with one end of said elongated extent forming the central portion of an elongated forward end of said boom extending transversely of said elongated extent along an axis; said forward end including elongated support portions extending outwardly from longitudinally spaced portions of said central portion coaxially along said axis; rotary means supported by said central portion for coaxial rotation about said axis; cutting means driven through an orbital path by said rotary means to cut clearance for at least said central portion; an elongated drum cutter means supported by said support portions, respectively, for coaxial rotation about said axis to cut clearance for the remainder of said forward end; elongated energizable drive means supported entirely within said forward end and extending coaxially along said axis; said drive means having substantially its entire axial extent extending outwardly of said central portion; elongated rotatable shaft means extending coaxially along said axis through the axial extent of said drive means and having a rotary driving connection to said rotary means; and said drive means having rotatable driving connections adjacent the axially outer end thereof to said cutter drum means and said shaft means for driving said cutter drum means and said cutting means, respectively.

4,047,764

COMPOSITE MOTORCYCLE WHEEL CONSTRUCTION

Thomas J. Lester, Aurora, Ohio, assignor to The Lester Tire Company, Bedford Heights, Ohio

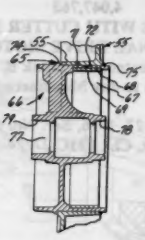
Continuation-in-part of Ser. No. 555,052, March 3, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 648,954

Int. Cl.² B60B *1/08*

U.S. Cl. 301—6 V **6 Claims**

1. A lightweight composite wheel and hub construction comprising a wheel unit casting of lightweight metal including aluminum, magnesium and alloys thereof; said wheel unit casting including concentric rim and tubular portions inte-

grally connected together by angularly spaced-apart spokes; said tubular portion having a bore therethrough coaxial with said rim portion; and a hub unit casting of lightweight metal including aluminum, magnesium, and alloys thereof; said hub unit casting having a central bearing receiving bore and a coaxial cylindrical exterior surface which is an interference fit with said bore of said tubular portion to compressively preload said spokes, to frictionally retain said units together against



relative rotation and relative axial movement, and to locate and retain said bearing receiving bore coaxially of said rim portion; said cylindrical surface projecting axially beyond one annular end of said tubular portion; said units being welded together around said one annular end and said axially projecting cylindrical surface to prevent relative movement thereof despite application of torque and axial loads exceeding the frictional resistance of said interference fit.

4,047,765

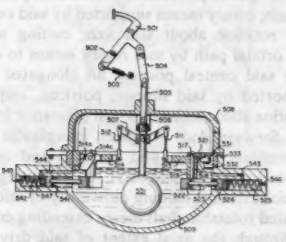
HYDRAULIC POWER TRANSMISSION AND BRAKING SYSTEM FOR VEHICLES

Bernhard Ulrich, Jr., Corpus Christi, Tex., assignor to Tex-Trans, Inc., Corpus Christi, Tex.

Division of Ser. No. 485,632, July 3, 1974, Pat. No. 3,966,365, which is a division of Ser. No. 305,513, Nov. 10, 1972, Pat. No. 3,827,239. This application Mar. 29, 1976, Ser. No. 671,389

Int. Cl.[2] B60T *8/18*

U.S. Cl. 303—24 F **12 Claims**



1. Brake control apparatus for automatically apportioning braking of the wheels of a vehicle in accordance with the load on respective wheels, comprising:

a brake pedal controllable by a vehicle operator;

a plurality of brake control cylinder assemblies, each brake control cylinder assembly corresponding to a wheel of said vehicle and being actuable to produce braking of the corresponding wheel;

mechanical means linking said brake pedal to each of said brake control cylinder assemblies for actuating said brake control cylinder assemblies equally in response to said brake pedal;

a pendulum;

means mounting said pendulum for displacement along the length and width of said vehicle from a predefined normal position and mechanical means connecting said pendulum to said actuating means, said connecting means including means responsive to lengthwise displacement of said pendulum for producing differences in actuation between brake cylinder assemblies corresponding to wheels at different locations along the length of the vehicle, and means responsive to widthwise displacement of said pendulum for providing differences in actuation between brake cylinder assemblies corresponding to wheels at different locations along the width of the vehicle for increasing the actuation of at least one of said brake cylinder assemblies while decreasing the actuation of at least another of said brake cylinder assemblies.

4,047,766

DIGITAL PHASE-LOCKED LOOP FOR SPEED MEASUREMENT, IN PARTICULAR FOR USE IN ANTISKID CONTROL SYSTEMS

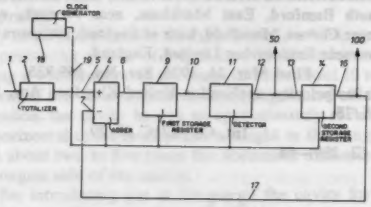
Hans-Wilhelm Bleckmann, Frankfurt, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed May 3, 1976, Ser. No. 682,818

Claims priority, application Germany, May 3, 1975, 2519867

Int. Cl.[2] B60T *8/08*

U.S. Cl. 303—97 **13 Claims**



1. A digital phase-locked loop for speed measurement, in particular for use in antiskid control systems, for the conversion of the frequency of an input pulse sequence which is proportional to the speed of a rotatable member into a digital numerical value suitable for use in a digital arithmetic unit including:

input means for providing a certain numerical value which will always be the same and which is allocated to any input pulse sequence;

at least one adder means having at least three inputs thereto and at least one output, one of said inputs of said adder being connected to said input means;

first storage register means having one input connected to and receiving the output of said first adder means, having at least another input for receiving clock pulses;

means for generating clock pulses;

detector means having a selected predetermined upper limit and a predetermined lower limit having one input connected to the output of said first storage register means, said detector means having another input connected to said means for generating clock pulses and generating at regular intervals a positive digital output numerical value when the content of said first storage register is above said predetermined upper limit and generating a negative digital output numerical value when the contents of said first storage register are below said predetermined lower limit;

second storage register means having one input connected to said detector means and having at least one other input receiving clock pulses from said means for generating clock pulses;

means for connecting the output of said detector means to said arithmetic unit also to said one input of said second storage register while maintaining the correct sign, whereby the content of said second storage register is the digital numerical value corresponding to the frequency of an input pulse sequence;

means connecting said second storage register to said means for generating said clock pulse and for connecting the output of said second storage register to both said arithme-

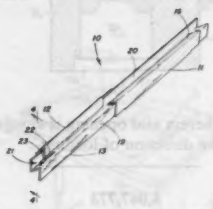
tic unit and another input to said adder means whereby said digital numerical value in said second storage register is always subtracted from the content of said first storage register upon the occurrence of each clock pulse generated by said means for generating said clock pulse.

4,047,767

SLIDE ASSEMBLY

Robert K. Foust, 301 Mary Kay Lane, Connersville, Ind. 47331

Filed Mar. 15, 1976, Ser. No. 666,961
Int. Cl.² F16C *29/02*
U.S. Cl. 308—3.6 **10 Claims**



1. A slide assembly which comprises:

a first rail and a second rail, each of said rails including a channel having first and second sides formed by mutually facing first and second surfaces, each of said rails further comprising a retainer flange extending generally from the first side to the second side, the retainer flange being spaced apart from the second surface and forming an acute angle with a plane parallel to the first surface; and

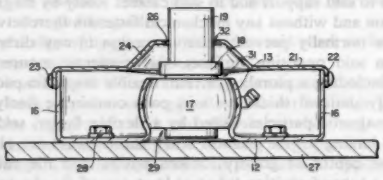
an elongated, free-sliding member having a generally Z-shaped cross section, the free-sliding member comprising a flat, elongated body having two longitudinal edges and further comprising a first and a second leg, each leg extending from opposite longitudinal edges of the body, the first leg forming an acute angle with a first surface of the body and the second leg forming an acute angle with a second surface of the body, the first leg being received within and bearing against the channel of said first rail, the retainer flange on said first rail being positioned near the second surface of the body, the second leg being received within said bearing against the channel of said second rail, the retainer flange on said second rail being positioned near the first surface of the body.

4,047,768

PROTECTED BEARING MOUNT ASSEMBLY

Earl S. Cain, Portola Valley; Jerome A. Carlson, Woodside, and George E. Goodrich, San Carlos, all of Calif., assignors to Tribotech, Redwood City, Calif.

Filed Mar. 25, 1976, Ser. No. 670,441
Int. Cl.² F16C *11/06*
U.S. Cl. 308—72 **8 Claims**



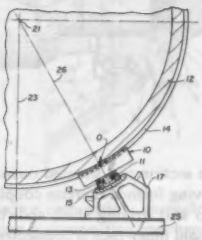
1. A protected bearing mount assembly including a bearing mounting flange extending from one surface of a plate with the outer edges of the plate being formed to extend in the same direction as the flange and surrounding the flange, a bearing mounted in said bearing mounting flange and a cover secured to the outer extending edges of said plate to enclose the bearing mounting flange and one end of the bearing between said cover and said plate.

4,047,769

APPARATUS FOR SUPPORTING A ROTARY BODY OF LARGE DIAMETER

Alain Chielens, Marcq-en-Baroeul, France, assignor to Fives-Cail Babcock, Paris, France

Filed Feb. 17, 1976, Ser. No. 658,362
Int. Cl.² F16C *41/02, 1/24*
U.S. Cl. 308—121 **6 Claims**



1. Apparatus for supporting a body of large diameter for rotation about an axis, the body having a pair of circular flanges defining therebetween an annular raceway coaxial with the axis of rotation, circular channels being formed at the intersections between the raceway and flanges, comprising

a. a stationary support frame,

b. a support block glidingly contacting the annular raceway,

1. the spacing between the flanges being such as to provide some axial play between the flanges and the support block,

c. means for feeding a lubricant to the interspace between the flanges and the support block, the lubricant feeding means including

1. a transverse groove extending in the direction of the axis and recessed in the gliding surface of the support block,

2. a source of lubricant in communication with the groove for feeding lubricant thereto, and

3. passages in communication with the gliding surface and having openings adjacent respective lateral edges of the support block for placing the groove in communication with the circular channels, the openings being at least partially covered by the raceway so that the openings are substantially of the same size when the support block is centered between the flanges and that they increase in size as the support block is displaced laterally in the direction of the respective opening, and

d. a swivel joint mounting the support block on the support frame.

4,047,770

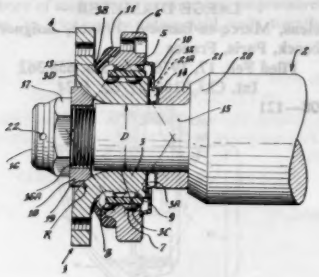
HUB BEARING UNIT ASSEMBLY

Abraham Korenhof, Driebergen, and Hendrikus Jan Kapaan, Ijselstein, both of Netherlands, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Sept. 22, 1975, Ser. No. 615,500
Claims priority, application Netherlands, Sept. 30, 1974, 7412873
Int. Cl.² F16C *33/00*
U.S. Cl. 308—191 **14 Claims**

1. In a hub bearing unit assembly having an inner and outer race ring, each having unified therewith a fastening flange, rows of rolling elements located between said races, said roll-

ing elements being separated from one another by means of a cage, said inner and outer race having seals coupled thereto, said seals acting to retain a lubricant contained between the rolling elements, and a driving shaft, the improvement comprising the end part head section of said inner race opposite its



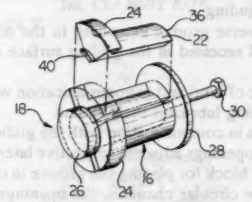
respective flange section and situated outside the inner side of said race ring having formed thereon coupling means, adapted to be coupled to said driving shaft and, by means of which coupling means said inner race is connected to said shaft so as to transmit power to said inner race, the inner side of said inner race facing said shaft in a nonpower transmissible manner.

4,047,771

BUSHING REMOVAL ADAPTER

Kennith E. Vaughn, Creve Coeur, and Hugh V. Piper, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,302
Int. Cl.² F16C *43/00*
U.S. Cl. 308—237 R **5 Claims**



1. An adapter for use in the servicing of press-fit bushings, comprising:

a sleeve having an annular, radially outwardly directed flange and comprised of a plurality of separate segments;

a plug received within said sleeve to prevent radially inward movement of said segments; and

means for holding said plug within said sleeve.

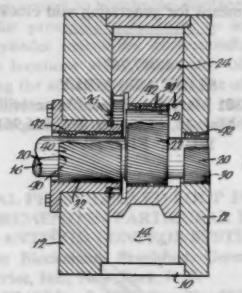
4,047,772

BEARING CONSTRUCTIONS

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 1, 1976, Ser. No. 691,911
Int. Cl.² F16C *27/00*
U.S. Cl. 308—237 R **6 Claims**

1. In a mechanism including a shaft, a relatively rotatable member having an opening receiving the shaft, a cylindrical bearing carried by the member and journalling the shaft, and means for loading said member generally radially of the shaft;



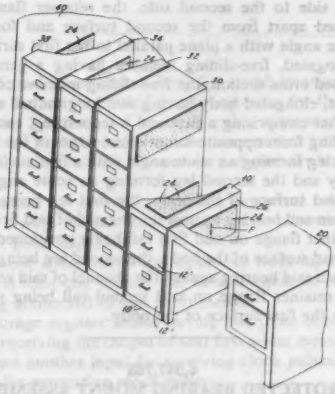
the improvement wherein said opening is elongated in a direction transverse to the direction of loading.

4,047,773

FILE CABINET SECUREMENT STRUCTURE

Joseph G. Semany, 10947 Rossiter, Detroit, Mich. 48224

Continuation of Ser. No. 449,729, March 11, 1974, abandoned.
This application June 2, 1975, Ser. No. 583,237
Int. Cl.² F16B *47/00*; A47B *87/00*
U.S. Cl. 312—111 **5 Claims**



1. The combination of a support, a file cabinet with a plurality of drawers therein, each drawer being extendable in a first direction, and magnetic securement means interposed between and magnetically secured to opposing surfaces of said support and said file cabinet, said magnetic securement means being secured to said support and to said cabinet solely by magnetic attraction and without any mechanical fasteners therebetween so as to normally prevent relative motion in any direction between said opposing surfaces, said magentic securement means including a plurality of thin, flexible magnetic pads of generally uniform thickness, said pads containing finely divided magnetic particles united by a flexible finder, said file cabinet having a first position when the drawers are closed with the center of gravity located within said file cabinet having a second position when at least one of the drawers is extended in said first direction to an open position where the center of gravity is in a different position resulting in a tipping force producing a first moment about an edge at the bottom of the file cabinet tending to tip the file cabinet, said magnetic pads when said file cabinet is at said second position providing a counter force producing a second moment at said edge at the

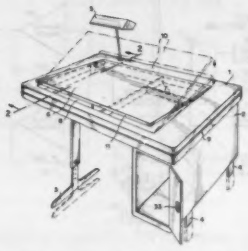
bottom of the file cabinet at least equal to said first moment and in an opposite direction thereby preventing said file cabinet from tipping.

4,047,774

STUDENT WORK TABLE

Michael Hanning, Oerlinghausen, Germany, assignor to Hanning-Kunststoffe Robert Hanning, Paderborn-Monkeloh, Germany

Filed Sept. 26, 1975, Ser. No. 617,071
Claims priority, application Germany, Sept. 26, 1974, 2445890
Int. Cl.[2] A47B *27/00*
U.S. Cl. 312—231 5 Claims



1. An adjustable table, comprising:

a table frame having a recessed storage compartment;

a work surface movably mounted on said table frame in overlying relation to said storage compartment;

means for alternately raising either of two opposite edge portions of said work surface, including

at least two vertically movable lifting members mounted on said table frame for urging said opposite edge portions of said work surface upward, and

a slidable member movable in opposite directions for alternately engaging said lifting members to urge the so engaged lifting member upward to thereby raise the corresponding one of said opposite work surface edge portions;

means for retaining the other of said work surface edge portions in a lowered position when said one work surface edge portion is raised, including

a pair of substantially parallel, trough-like guides locatd in said table frame, said other work surface edge portion being guided in its corresponding trough-like guide when said one work surface edge portion is raised,

a plurality of locking pins fixed to said table frame, and

a plurality of pockets mounted on said work surface adjacent said opposite edge portions, the pockets adjacent said other edge portion engaging corresponding locking pins when said one work surface edge portion is raised to thereby retain said opposite edge portion in its trough-like guide;

a plurality of hinge eyes mounted to said work surface adjacent said opposite edge portions;

at least one pair of movable hinge pins mounted on said table frame adjacent said opposite work surface edge portions for engagement with said slidable member; and

means normally biasing said movable hinge pins into engagement with said hinge eyes to prevent said opposite edge portions of said work surface from being rasied;

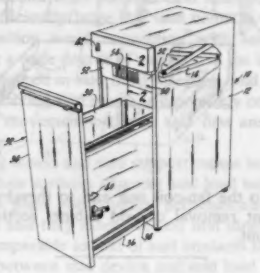
wherein, when said slidable member is moved in one of its opposite directions to engage a lifting member, said slidable member concurrently engages one of said pins to urge said one hinge pin out of engagement with its associated hinge eye to thereby permit said lifting member to raise said one work surface edge portion.

4,047,775

DEODORIZER FOR TRASH COMPACTORS

David W. Wolbrink, Hartford, Wis., assignor to Broan Manufacturing Co., Inc., Hartford, Wis.

Filed Sept. 16, 1975, Ser. No. 613,922
Int. Cl.[2] B30B *15/00*
U.S. Cl. 312—211 2 Claims



1. A trash compactor comprising: an enclosure including a means for positioning a compacting mechanism in the upper portion thereof, said enclosure having a front panel with an opening in the lower portion containing a drawer moveable between an open position and a closed position with respect to said enclosure; a receptacle mounted on said drawer and having an open upper end at which the trash is exposed for emitting offensive odors to the air within the enclosure, said compacting mechanism entering the open end of said receptacle for compacting the trash; and an odor control means having a tray-like holder mounted on said positioning means above the receptacle and across the opening in the front panel of the enclosure, said holder containing an odor treatment material continuously applying an odor treatment substance to the air for treating the air within said enclosure for modifying the odor laden air to reduce its offensiveness, said holder having generally parallel front and back walls and a bottom wall and being open at the top, said front wall having an entry through which the odor treatment material is insertable in the holder, said rear wall having a plurality of openings of a size sufficient to permit an unimpeded flow of air therethrough, said openings forming, with said entry in the front wall of said holder, an air passage through said holder and across said odor treatment material for forming a heavily treated stratum of air along the top of receptacle expellable from said enclosure by movement of the drawer between the open and closed positions.

4,047,776

CABINET CONSTRUCTION

Edward F. Krick, Phoenix, and David E. MacLeod, Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,272
Int. Cl.[2] A47F *5/08*; F25D *23/12*
U.S. Cl. 312—245 7 Claims

1. A cabinet construction for housing a fan-coil unit, said cabinet construction comprising:

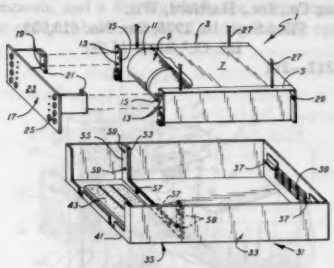
a first cabinet section dimensioned to house a first portion of the fan-coil unit, said first cabinet section having structure for engaging cooperating structure on the fan-coil unit to releasably hold said section on the fan-coil unit and a locating surface,

a second cabinet section attached to the first cabinet section and dimensioned to house a second portion of the fan-coil unit

latching means connected to the fan-coil unit for cooperating with said locating surface to position said cabinet sections to maintain said structure on said first cabinet section in engagement with said cooperating structure, and

connector means for connecting said first and second cabinet

sections to said latching means to cooperate with said structure on said first cabinet section to secure said cabinet



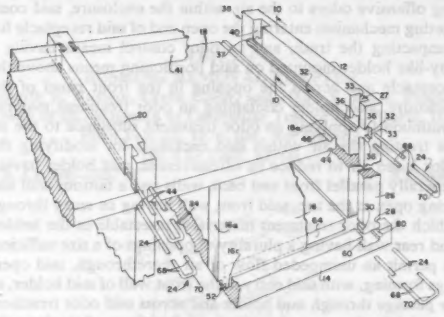
sections to the fan-coil unit and to thereby prevent the inadvertant removal of said cabinet sections from the fan-coil unit.

4,047,777

KNOCKDOWN PUT-TOGETHER ARTICLE OF FURNITURE

Raymond Pfeifer, 5530 S. Lake Shore Drive, Chicago, Ill. 60616, and Roger Ringger, 7480 SW. Fifth St., Plantation, Fla. 33566

Filed Nov. 10, 1975, Ser. No. 630,434
Int. Cl.[2] E04C 1/10
U.S. Cl. 312—263 **6 Claims**



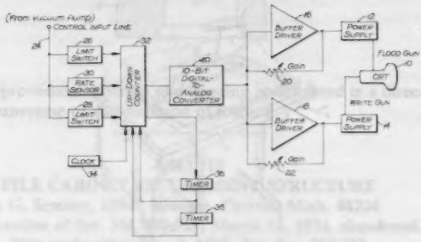
1. A knockdown, put-together article of furniture comprising a pair of spaced side members and a top, each of said spaced side members having a horizontally extending groove adjacent the upper end thereof and on each of the opposite sides of each said side members, said grooves extending substantially from the front to the rear of the side members, said top having an inwardly or downwardly facing channel adjacent the side edges thereof to receive the upper end of said side member, each said channel having spaced opposite sides, said top inwardly facing channels each having a longitudinal groove on each of the spaced opposite sides which grooves extend substantially from the front to the rear of the top and align and cooperate with the grooves in the side member when the upper end of a said side member is positioned within said channel to form at least four cooperating and aligned grooves, a U-shaped non-threaded integrally formed interlocking member having spaced generally parallel sides of a length to extend substantially the length of the cooperating grooves and a connecting end portion with said spaced parallel sides of said interlocking member slidably insertable into said cooperating grooves to simultaneously engage said four cooperating grooves to interlock the top to said side members and with said connecting end portions engaging the end of said side member to limit the insertion of said U-shaped interlocking member each of the side members having a horizontally extending, inwardly facing channel and inwardly facing grooves in said channel, a bottom having its opposite ends secured in said horizontal channel, said bottom having cooperating grooves which are aligned with the grooves in the side channel and a U-shaped interlocking member insertable into said cooperating grooves to lock said bottom to said sides.

4,047,778

APPARATUS FOR CONVERTING CRT CATHODES

Julius A. Csaki, Colorado Springs, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 16, 1975, Ser. No. 623,148
Int. Cl.[2] H01J 9/385
U.S. Cl. 316—18 **7 Claims**



1. Apparatus for converting a cathode of a cathode ray tube (CRT) during the manufacture of the CRT, the apparatus comprising:

power supply means for applying a conversion voltage to a CRT filament associated with the CRT cathode to be converted;

vacuum pump means for establishing a vacuum condition within the CRT;

vacuum sensing means for detecting the vacuum level within the CRT during conversion; and

logic means coupled to said power supply means and vacuum sensing means, said logic means being responsive to said vacuum sensing means for causing said conversion voltage to steadily increase from a first predetermined voltage level to a second predetermined voltage level so long as the vacuum level within the CRT is greater than a first predetermined vacuum level, said logic means being responsive to said vacuum sensing means for causing said conversion voltage to steadily decrease from the most recently achieved voltage level toward said first predetermined voltage level if the vacuum level within the CRT falls below a second predetermined vacuum level that is lower than said first predetermined vacuum level, said logic means being responsive to said vacuum sensing means for preventing any increase or decrease in the most recently achieved conversion voltage so long as the vacuum level within the CRT is between said first and second predetermined vacuum levels.

4,047,779

ANTENNA COUPLINGS

John H. Klancnik, Des Plaines, Ill., assignor to Afco Products Incorporated, Des Plaines, Ill.

Filed Oct. 16, 1975, Ser. No. 623,015
Int. Cl.[2] H01R 41/00
U.S. Cl. 339—9 A **24 Claims**

12. A coupling for a vehicle-mounted antenna for coupling the antenna to a base mount attached to a part of the vehicle while permitting detachment of the antenna and comprising:

a shell member having an internal recess;

a stud member having a first portion disposed in said recess and a second portion extending axially thereof;

said members being relatively moveable and respectively having means carried thereby enabling the coupling to be

attached to the base mount and enabling the antenna to be attached to the coupling;

one of said members having a radially extending lock pin fixed thereto separably joining the members;

a rotatable release member surrounding the other two members and having a circumferential groove in which the pin normally resides,

said release member also having a plurality of openings spaced about the groove for receiving the pin, each opening including a stop means preventing the separation of

the stud and shell members when the pin is aligned therein;

said release member having an axial slot therein which, when the pin is aligned therewith, is permissive of the shell and stud members being separated along with the antenna carried by one of the separated members, whereby knowledge of the location of the slot allows quick separation but lack of knowledge requires hunting for the slot; and

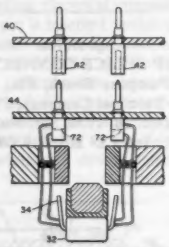
spring means biasing the release member normally to a position where the groove is aligned with the pin.

4,047,780

TEST CONTACTOR SYSTEM FOR SEMICONDUCTOR DEVICE HANDLING APPARATUS

Nicholas J. Cedrone, 10 Hawthorne Road, Wellesley Hills, Mass. 02181

Filed Apr. 7, 1976, Ser. No. 674,498
Int. Cl.² H05K *1/14*
U.S. Cl. 339—17 CF **9 Claims**



1. Means for reliably making and breaking electrical connection at a high repetition rate between a succession of electronic devices, each having a plurality of leads extending generally in a first direction, and a load board in electrical connection with a like plurality of pins spaced from said leads along said first direction, comprising, in combination,

a plurality of contacts,

means for supporting said contacts so that each contact extends generally in said first direction, said support means being movable between first and second limit positions spaced from one another along a third direction transverse to said first direction, and each of said contacts being positioned on said support means to make electrical connection between one of said leads and one of said pins when said support means is in said first limit position and to break electrical connection with both said one of said leads and said one of said pins when said support means is in said second limit position, said limit position spacing being sufficiently large that said contacts in said second limit position avoid connection with said leads while allowing a wide degree of variation in the location of said leads measured in said third direction, and

means for driving said means in a precisely controlled, symmetrical movement between said first and second limit positions,

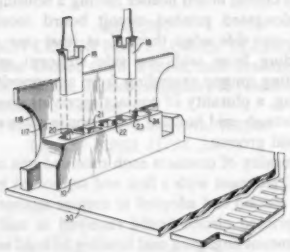
said driving means and said support means being structured so that their surfaces adjacent said load board are unlimited in a plane substantially perpendicular to said first direction and they extend in said first direction for a distance comparable to that of said contacts to minimize the spacing between said device and said load board.

4,047,781

PRINTED WIRING BOARD HANDLE HAVING VIEWABLE OPTION CONNECTORS

Ernest Gerard DeNigris, Colts Neck, and Ralph John Palette, Middletown, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 30, 1976, Ser. No. 701,425
Int. Cl.² H05K *1/14, 1/18*
U.S. Cl. 339—17 R **11 Claims**



1. A handle for attachment along a side edge of a printed wiring circuit board, said handle comprising:

outer and inner surfaces, separated by a central portion, said central portion including upper and lower surfaces,

a plurality of electrical contacts disposed within said central portion, and extending through said lower surface for attachment to said side edge of said circuit board, each of said electrical contacts arranged for mating relationship with one contact of a multicontact connector, and said electrical contacts arranged into groups,

a plurality of windows in said outer surface of said handle, each said group uniquely associated with one of said groups of contacts,

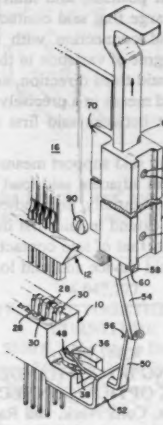
said contacts being arranged into subgroups within each said group in a manner allowing a single multicontact connector to become connected optionally and exclusively to any selected one of said subgroups, one contact within each group being common to at least two subgroups, each said window being positioned with respect to said associated group of contacts in a manner which allows a visual determination to be made through said window as to which one of said subgroups of contacts of said associated group of contacts a multiconnector is connected.

4,047,782

ROTARY CAM LOW INSERTION FORCE CONNECTOR WITH TOP ACTUATION

Marvin Leo Yeager, Carlisle, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 23, 1976, Ser. No. 698,979
Int. Cl.[2] H01R 13/62; H05K 1/07
U.S. Cl. 339—75 MP 3 Claims



1. A remotely actuated, rotary cam operated, low insertion force, edge board connector assembly for electrically and mechanically engaging a printed circuit board, said assembly comprising:

a printed circuit board header having a housing with at least one elongated printed circuit board receiving groove along one side edge thereof, at least one mounting tab extending from said one side adjacent said groove, a mounting tongue extending from an opposite side of said housing, a plurality of contact receiving passages extending through said housing on opposite sides of said tongue and said groove,

a like plurality of contacts each received in a respective one of said passages with a first end supported by said tongue and a second end adopted to engage against contact pads of a printed circuit board received in said groove, and latch means engaging said housing to hold said contacts in position, and

mounting means securing said printed circuit board to each said at least one mounting tab;

a low insertion force edge board connector having an elongated housing with an elongated recess for receiving said printed circuit board header therein,

a plurality of contacts disposed in said housing in parallel spaced relationship on opposite sides of said elongated recess,

a contact actuator member positioned in said recess to act against said contacts to move them between first and second positions in which they respectively engage and disengage said contacts of said printed circuit board header received therebetween, and

rotary cam means adapted to drive said contact actuator member between said first and said second positions;

printed circuit board guide means in fixed relationship to said connector and adapted to guide said board during insertion into and withdrawal from said connector,

said guide means including a pair of channel-shaped guide housing members each in fixed relation to a respective end of said connector housing, each said guide housing member extending normal to the elongated axis of said connector housing aligned with and opening in the direction of said recess, and

a passageway through one of said guide housing members; and

remote cam actuating means movably mounted in said passageway, and including an axially moving actuator rod, and

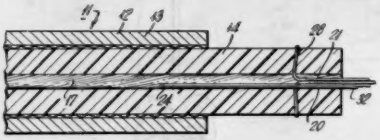
linkage means connecting one end of said actuator rod to the rotary cam of said connector whereby said rotary cam can be actuated from a position remote from said connector.

4,047,783

ELECTRICAL TERMINAL CONNECTOR

Robert E. Canup, Poughkeepsie, N.Y., and Earl W. McPeak, Jr., Powhatan, Va., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,086
Int. Cl.[2] H01R 11/20
U.S. Cl. 339—97 R 7 Claims



1. An electrical connector for making a terminal connection with a resistive type conductor having a layer of insulation thereover, comprising

a pair of solid copper wires,

one of said wires being doubled back and inserted longitudinally into said resistive type conductor,

said doubled end of said one wire forming rounded external surfaces and being inserted sufficiently into the core of said resistive type conductor to maximise the electrical contact therewith,

the other of said wires being wrapped around the outside of said layer of insulation and piercing through at diametrically spaced locations to extend radially into the core of said resistive type conductor,

said other wire extending parallel to said doubled one wire in the core of said resistive type conductor to maximise its electrical contact while said wrap around maximises mechanical contact,

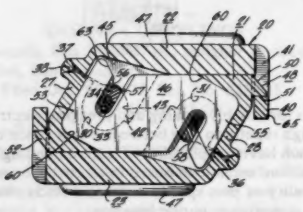
both of said wires having the free ends thereof extending far enough out from the end of said resistive type conductor to accomodate bonding together for good electrical and mechanical contact.

4,047,784

TAP SPLICE CONNECTOR

Robert D. Trank, Pompano Beach, Fla., assignor to Hollingsworth Solderless Terminal Company, Phoenixville, Pa.

Filed Dec. 28, 1976, Ser. No. 755,037
Int. Cl.[2] H01R 9/08
U.S. Cl. 339—98 2 Claims



1. A connector for insulated electrical wires comprising:

a. a body portion having an S-shaped cross section forming a wire-receiving channel at each interior bend of the S;

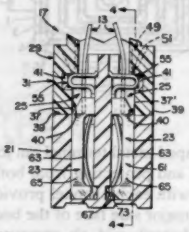
b. a cover hinged at each end of the S;
c. latch means for securing each cover in closed position; and
d. a metal contact plate in the body portion extending into each channel.

4,047,785

ELECTRICAL CONNECTOR, ASSEMBLY, AND CONTACT

Max Leroy Jayne, North Warren, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,257
Int. Cl.[2] H01R *13/38*
U.S. Cl. 339—99 R **33 Claims**



1. A connector for electrically interconnecting at least one electrical wire having an insulative covering thereon and at least one electrically conductive male pin, said connector comprising:

an electrically insulative housing including at least one open portion therein and first and second openings each having access to said open portion, said fist opening adapted for receiving said electrical wire, said second opening adapted for receiving said male pin when said male pin is inserted within said housing;

at least one electrical contact positioned substantially within said open portion of said housing and having a slotted first end portion for positively retaining and electrically engaging said electrical wire when said wire is received within said first opening of said housing and a second opposing end portion comprising first and second extending arm members each including a substantially bowed portion, said first extending arm member adapted for positively engaging a wall of said open portion within said housing, said second extending arm member adapted for slidably engaging and making electrical contact with said male pin when said male pin is inserted within said housing; and

separable cover means for being positioned on said housing to substantially cover said electrical wire within said connector, said cover means comprising at least two cover members each having a base portion for slidably engaging said housing and an extending portion, said extending portions defining an opening for receiving said electrical wire when said cover members are positioned on said housing.

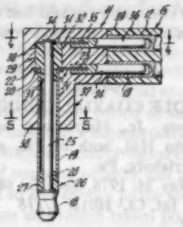
4,047,786

ELECTRICAL CONNECTOR

James J. Gietzen, Smithtown, N.Y., assignor to Dynamic Instrument Corporation, Hauppauge, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,273
Int. Cl.[2] H01R *17/18*
U.S. Cl. 339—154 A **3 Claims**

1. An electrical connector for applying energy to an electrical device comprising a receptacle and cooperating adaptor plug, said receptacle including a body of insulating material, a pair of spaced openings in one surface of said body, electrical connecting means disposed within said openings and an electric cable connected within said body to said electrical connecting means and extending from said body for connection to a power source and said adaptor plug including a body of material, a pair of pins extending from one surface of the last said body for mating with the electrical connecting means in said receptacle, a cylindrical dual contactor plug extending from another surface of said body and means within the last said body connecting each of said pins to one of the contactors of the last said plug, the surfaces of the body of said adapter plug being disposed at about 90° one relative to the other and said cylindrical dual contactor plug comprising an outer sleeve forming one contactor, a centrally disposed rod insulated from



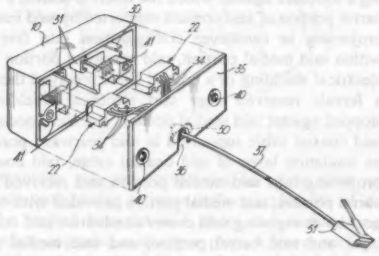
said sleeve and carrying the other contactor, the inner end of said sleeve having a lug portion extending at 90° thereto and a tubular insulating member having a diameter at least equal to the diameter of said sleeve and a section of reduced diameter disposed within said sleeve, a second lug having a circular portion overlying the outer end of said insulator and a portion extending therefrom, said rod extending through said insulator and second lug and swaged to secure it in position and said pins being coplanar with and electrically coupled to said extending lug portions.

4,047,787

EXTENSION CORDS FOR PLUG-IN TELEPHONES

Beverly William Gumb; Gerd Kuhfus, and Frederick Thomas Cogan, all of London, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 21, 1977, Ser. No. 761,067
Int. Cl.[2] H01R *13/54, 25/04*
U.S. Cl. 339—154 A **4 Claims**



1. An extension cord for plug-in telephones, comprising:

a line cord;

a plug on one end of said line cord, said plug adapted for insertion in a telephone outlet;

a multi-outlet member on the other end of said cord, said multi-outlet member comprising a main part of hollow box-like form having a front, top and bottom, and ends, at least two apertures in said front, each aperture having a predetermined profile for reception of a plug therein, a jack aligned with each aperture on the inside of said front, each jack having a lower part integral with said front and comprising two spaced apart side walls extending normal to said front and a bridge member at the rear of said side walls and extending between said side walls and integral

therewith, and an upper part positioned on said lower part and including two spaced apart parallel channels in an undersurface thereof, said channels slidable on said side walls of said lower part;

a retaining member on each end on the inside thereof and two further retaining members extending from the inside of said front, said retaining members extending over said side walls of said lower parts to retain said top parts of said jacks on said lower parts; and

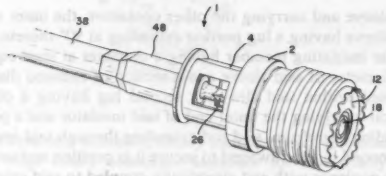
a back cover attached to the main part, a slot in said back, said line cord passing through said slot into the multi-outlet member, the conductors in said line cord connected to conductors in said jacks, said jacks connected in parallel.

4,047,788

PORT HOLE COAXIAL CONNECTOR

Edgar Wilmot Forney, Jr., Harrisburg, and Richard Shure Hogendobler, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 24, 1976, Ser. No. 689,020
Int. Cl.[2] H01R *17/18*
U.S. Cl. 339—177 R **1 Claim**



1. In a coaxial connector, wherein a center conductor and outer shielding are crimped simultaneously, and a portion of the connector is provided with port holes exposing a central electrical contact for crimping on the center conductor, the improvement comprising:

a medial portion of the connector being larger in cross section than a rearward portion and smaller in cross section than a forward portion of said connector, the forward portion having a dielectric insert and an electrical contact, the medial portion being substantially hollow and providing a shoulder against which the insert is seated, a hollow barrel portion of said contact supported by said insert and projecting in cantilever configuration into free space within said medial portion, said rearward portion having electrical shielding of a coaxial cable received thereover, a ferrule received over said electrical shielding and stopped against said medial portion, a center conductor of said coaxial cable supported in said rearward portion by an insulation layer of said coaxial cable, said conductor projecting into said medial portion and received in said barrel portion, said medial portion provided with opposed port holes exposing said center conductor, said insulation layer and said barrel portion, and said medial portion provided with two flat surfaces alternately spaced with said port holes around the periphery of said medial portion, said flat surfaces providing for nesting of the connector between walls of a crimping die which is enterable within one said port hole.

4,047,789

ELECTRICAL DISTRIBUTOR BLOCKS

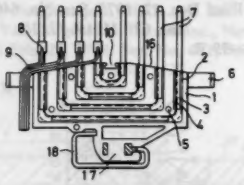
Gottfried Glaesel, Minusio, Switzerland, assignor to Hego Electric GmbH, Glarus, Switzerland

Filed Feb. 23, 1976, Ser. No. 660,547
Int. Cl.[2] H01R *9/16*
U.S. Cl. 339—198 H **9 Claims**

1. An electrical distributor block comprising

a. a body of electrically insulating material having two parallel major side faces and narrow further faces extending between the said major side faces;

b. a plurality of generally U-shaped channels in at least one of the major side faces, all the channels being open at both ends through a single one of the narrow faces, at least one said channel being of L-shaped cross-section transverse to its length for receiving selectively a said pin disposed with its greatest cross-sectional dimension either perpendicular or parallel to the major side faces;



c. a generally U-shaped metal terminal pin located in at least one said channel and projecting from both ends thereof;

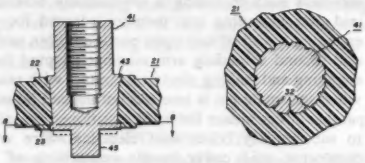
d. a rib associated with each channel provided on and projecting from the major side face of the body opposite that containing the channel, said rib corresponding in shape and position to and of no greater lateral dimensions that the associated channel, whereby when two identical blocks are placed side by side the ribs of a first said block will enter the channels of the adjacent block thereby to retain said pin in said channel.

4,047,790

INSULATIVE HEADER ASSEMBLY WITH FEED THROUGH TERMINALS

John W. Carino, Columbia, S.C., assignor to General Electric Company, Hudson Falls, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,094
Int. Cl.[2] H01R *9/16;* **H01G** *9/10, 1/153*
U.S. Cl. 339—220 C **24 Claims**



1. In combination, a header assembly comprising:

a disc-like header made of insulating material and having a slightly tapered opening projecting transversely therethrough, the narrow end of said tapered opening having a depression formed therein and defining a shoulder, said depression including a peripheral row of axial spline means;

a one-piece metal feed through terminal pressed into said opening, said terminal having a tapered portion which is fitted into said tapered opening tightly enough to form a seal therewith, said terminal extending at least into said depression;

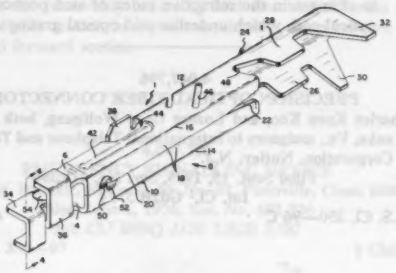
said terminal being formed of a material which is softer than the material of said header so that when pressed into said opening said terminal conforms to irregularities in said opening to enhance the seal; and

at least a portion of the part of said terminal that is within said depression being flared so that said portion overlaps said shoulder and conforms with said spline means.

4,047,791
LOW INSERTION FORCE RECEPTACLE AND CAMMED HOUSING

Clyde Thomas Carter, Shermansdale, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 530,262, Dec. 6, 1974, abandoned, which is a division of Ser. No. 367,072, June 4, 1973, Pat. No. 3,865,457. This application Feb. 17, 1976, Ser. No. 658,158
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—260 4 Claims

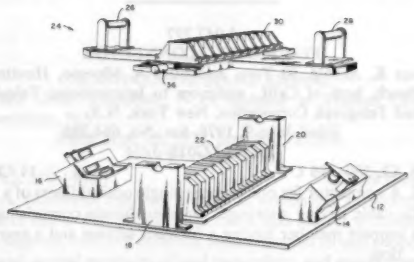


1. An electrical terminal, comprising:
a body portion and a wire engaging portion and a pair of projecting and normally spaced apart resilient spring arms having U-shaped ends,
said spring arms having gripping surfaces thereon,
said U-shaped ends being resiliently biased into mutual tandem alignment whereby said gripping surfaces are separated to freely receive therebetween a male terminal inserted into each of said U-shaped ends,
said spring arms being resiliently deflected outwardly away from each other when said U-shaped ends are biased into mutual tandem alignment,
said U-shaped ends being capable of resilient deflection out of tandem alignment to allow said spring arms to deflect toward each other whereby to engage the gripping surfaces thereof on a male terminal, and
said body portion includes a plurality of cutout portions defining sections of the body portion having different degrees of resilient deflection as a reaction to resilient deflection of said spring arms toward each other.

4,047,792
TORQUE WHILE TURN-AROUND SCAN MIRROR ASSEMBLY

C. Harold Dale, Jr., Malibu; Spencer D. Howe; Robert L. Bonebreak, both of Los Angeles, and Charles J. Starkus, Culver City, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 31, 1975, Ser. No. 645,491
Int. Cl.[2] G02B *27/17*
U.S. Cl. 350—6 8 Claims

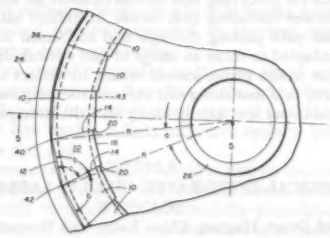


1. A scan assembly comprising a housing, a scan member mounted by means of flexural pivots to said housing, a torquer device mounted between said scan member and said housing for providing in response to an applied electrical control signal, energy to said member so as to cause it to rotate on said flexural pivots, at least two spring means each of which are disposed for contacting said scan member near the end of its travel in one respective direction, for absorbing energy therefrom and for reapplying a portion of said energy to drive said member in the opposite direction, said spring means each include at least one leaf spring mounted so as to be in substantial engagement with said scan member during at least a portion of the turn-around period at the end of each scanning cycle, and wherein the improvement comprises circuit means for sensing the contact of said scan member with said spring means and for applying a control signal to said torquer so as to impart during the turn-around period of said scan member the energy required to maintain a substantially constant scan rate for said member with said control signal comprising first and second segments of opposite polarity and poled so as to drive said torquer device to add energy to the scan mirror assembly during the deflection and return travel portions of the movement of said leaf springs and said circuit means including means for comparing the scan angle sequence of said member to that of a reference signal pulse train and for controlling the duration of said control signal so as to substantially maintain a scan angle sequence which is determined by said reference signal pulse train.

4,047,793
POLYGON SCANNER WITH AN ANNULAR LIP

John M. Lang, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 9, 1976, Ser. No. 675,101
Int. Cl.[2] G02B *27/17*
U.S. Cl. 350—7 9 Claims



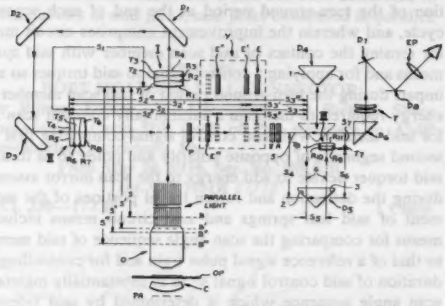
1. A scanning polygon comprising an upper plate and a lower plate, each having an inner surface; a plurality of identical blocks located between said plates and each having an upper surface engaging said upper plate, a lower surface engaging said lower plate and first, second and third side edges joining said upper and lower surfaces; said first and second side edges intersecting said third side edge to form respective corners therewith; said third edge being a highly reflective facet; an annular lip extending from the inner surface of at least one of said plates towards the other of said plates; the height of said lip beyond said inner surface being substantially less than the thickness of said facet edge; said blocks being arranged in such a manner that said first edge of one block abuts said second edge of the block adjacent thereto, and said corners of each block engages said lip whereby said facet edges of each block form chords along the lip to form a polygon; the angle of the corner formed by said first edge and said facet being substantially 90°; and the angle of the corner formed by said second edge and said facet being substantially $90° - (360°/N)$ where N is the number of facets forming the polygon.

4,047,794

OPTICAL RELAY FOR A MICROSCOPE AND A BACK APERTURE VIEWER THEREFOR

Ernest D. Park, Clarence, and Joseph C. Dianetti, East Aurora, both of N.Y., assignors to American Optical Corporation, Southbridge, Mass.

Division of Ser. No. 656,763, Feb. 9, 1976. This application Nov. 1, 1976, Ser. No. 737,743
Int. Cl.[2] G02B 21/06
U.S. Cl. 350—54 2 Claims



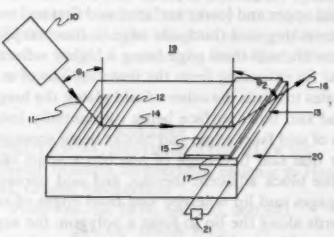
1. In a microscope having an observation system including in optical alignment along an axis, an objective, a telescope lens and an eyepiece, said objective having a back focal plane and said eyepiece having an image plane, a relay lens system to relay said back focal plane to an optically equivalent location in a station positioned between said objective and said telescope lens and an optical element at said station selectively positionable in said location for rendering said optical element operable in a manner equivalent to being positioned in said back focal plane, the improvement comprising a viewer selectively positionable on said axis between said station and said eyepiece for observing said optical element, an additional lens, said viewer including first means to deflect said axis to an alternate path passing through said additional lens, said lens being adapted to focus an image of said optical element in said eyepiece image plane, second means to deflect said alternate path after said lens along said axis and focusing means to move said additional lens axially along said alternate path.

4,047,795

OPTICAL INTEGRATED CIRCUIT LASER BEAM SCANNER

Richard Swart Hughes, China Lake, and Howard A. Wilcox, Santa Barbara, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 22, 1974, Ser. No. 526,299
Int. Cl.[2] G02B 5/14; G02F 1/29
U.S. Cl. 350—96 C 17 Claims



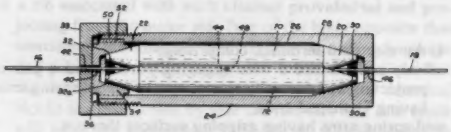
1. A variable optic coupler, comprising:
an optical path formed of a material which responds to a high electric field by manifesting the electro-optic effect, for propagating a laser beam;
means for coupling said laser beam into and out of said optical path at predetermined coupling angles, wherein said coupling means has at least one optical grating coupler overlying at least a portion of said optical path;
means for electro-optically changing the refractive index of said portion of the optical path which underlies said optical grating coupler;
so arranged and constructed that the laser beam coupling angle at said optical grating coupler changes in response to changes in the refractive index of said portion of the optical path which underlies said optical grating coupler.

4,047,796

PRECISION OPTICAL FIBER CONNECTOR

Charles Kuen Kao, and Lozure Gene Wolfgang, both of Roanoke, Va., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Sept. 15, 1975, Ser. No. 613,390
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96 C 4 Claims



1. An optical fiber coupling device comprising:
a tubular housing;
a plurality of like-sized cylindrical rods supported longitudinally within said housing and having adjacent circumferential surfaces providing an interstitial space between said rods to receive abutting ends of a pair of longitudinal optical fibers, said rods being conically tapered at opposite ends providing a smaller diameter at said rod ends, said housing having a cylindrical bore with an opening at one end and a tapered wall within the other end having a conical taper corresponding to said rods to engage said rod ends, said one end of said housing having an outer threaded peripheral surface, said other end having a central aperture to receive an optical fiber therethrough;
means for expanding said interstitial space to permit insertion of said fibers; and
means for compressing said rods about said fibers to axially align and secure said fibers within said interstitial space said compressing means including a compression ring having corresponding tapered inner walls engaging the ends of said rods at said opening, and a threaded cap adjustably secured on said threaded end of said housing over said compression ring to urge said ring against said rods and said rods around said fibers.

4,047,797

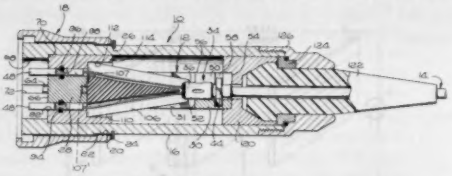
FIBER OPTIC CONNECTOR

Bruce K. Arnold, El Toro, and Elias A. Moreno, Huntington Beach, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 9, 1976, Ser. No. 694,305
Int. Cl.[2] G02B 5/16
U.S. Cl. 350—96 C 14 Claims

1. A connector for one or more single optical fibers of a fiber optic cable having a strength member therein comprising:
a support member having a forward section and a rear section;
means on said forward section for releasably mounting a contact terminated to a single optical fiber;

means for making fixed attachment to the strength member of a fiber optic cable; and



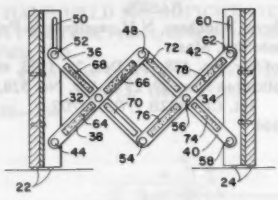
means for removably mounting said attachment means on said rear section in a predetermined position relative to said forward section.

4,047,798

EMERGENCY SIGNALLING DEVICE

James M. Bennett, 68 Cooke St. No. 41, Plainville, Conn. 06062

Filed June 1, 1976, Ser. No. 691,326
Int. Cl.² B60Q 1/26; G02B 5/00
U.S. Cl. 350—97 **1 Claim**



1. A compact emergency signalling device comprising a pair of parallelly disposed longitudinal end elements, magnetic securing mens for magnetically fastening said pair of said end elements to a magnetically susceptible surface, linkage means enabling said pair of said end elements to be spacedly maintained a variable distance apart from each other, handle means for manually positioning said pair of said end elements said variable distance apart from each other, light reflection means located on said linkage means for heightening the visibility of said pair of said end elements and said linkage means, wherein each of said pair of said end elements has an L-shaped cross-section, a pair of U-shaped longitudinal tracks, one of said pair of said tracks fixedly secured to one leg of said L-shaped cross-section of said each of said pair of said end elements, the other legs of said L-shaped cross-section of said each of said pair of said end elements directed inwardly towards each other, said one leg of said each of said pair of said end elements disposed in juxtaposed parallel relationship.

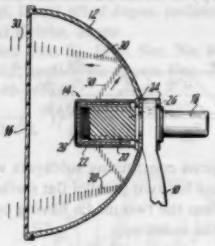
4,047,799

MULTI-COLOR HAND SIGNAL

Howard Cross, Hartsdale, N.Y., assignor to Frances Cross, Hartsdale, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,665
Int. Cl.² G02B 5/12
U.S. Cl. 350—97 **10 Claims**

1. A hand-held indicator for use in selectively providing a signal of one of two preselected colors, said indicator comprising a support, concave reflector means secured to said support, first and second members of said two colors, and means operatively connected to said support and to at least one of said first and second members for selectively positioning one of said first and second members in the vicinity of the focal point of said



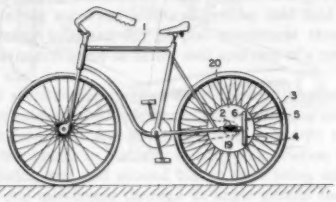
reflector means from which the selected one of said color members is reflected by said reflector means.

4,047,800

BICYCLE REFLECTOR DEVICE

Paul J. DiBease, Ocean City, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 13, 1976, Ser. No. 686,157
Int. Cl.² G02B 5/12
U.S. Cl. 350—99 **3 Claims**



1. A bicycle reflector device for a bicycle having a rear axle and a rear wheel rotatably mounted on the rear axle, said bicycle reflector device comprising

a wheel disc coaxially mounted on the rear wheel and having a diameter smaller than that of the rear wheel, said wheel disc rotating with the rear axle;

a reflector disc having a light reflective surface, said disc having a rim; and

mounting means mounting the reflector disc on the rear axle of a bicycle in a manner whereby said disc is positioned substantially vertically and substantially perpendicularly to the plane of the rear wheel with the rim of the disc in abutment with said wheel whereby rotation of the rear wheel causes rotation of the wheel disc and rotates the reflector disc about its axis.

4,047,801

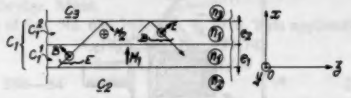
OPTICAL WAVE GUIDE HAVING DISTRIBUTED GYROTROPY

Didier Challeton, 18, avenue de l'Europe, 38120 St Egreve; Philippe Coeure, 11, place Jean Moulin, 38000 Grenoble; Jean Pierre Jadot, 6, impasse des Lecheres, 38240 Meylan, and Jean Claude Peuzin, Lotissement des 4 Seigneurs, 38320 Eybens, all of France

Filed Mar. 24, 1976, Ser. No. 669,887
Claims priority, application France, Apr. 2, 1975, 75.10296
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG **13 Claims**

1. An optical wave guide comprising a layer C_1 of magnetizable material having a substantially constant optical index of refraction equal to n_1 throughout said layer and a predetermined thickness disposed between two parallel media each having an optical index of refraction of lower value than the

index n_1, the said predetermined thickness C_1 corresponding to the distance between said media, wherein the layer C_1 exhibits distributed gyrotropy as herein defined and comprises a plural-



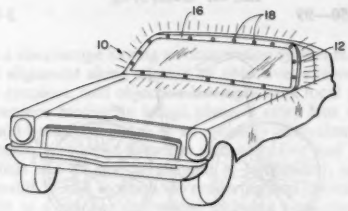
ity of adjacent regions constituting sublayers which are parallel to each other and has two parallel flat surfaces which separate the layer C_1 from the two media having optical indices of lower value than the index n_1.

4,047,802

REFLECTING DEVICE

Eli Pieters, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed July 8, 1976, Ser. No. 703,355
Int. Cl.² G02B 5/12
U.S. Cl. 350—97 **3 Claims**



1. A reflecting device for use with a vehicle with a windshield having a peripheral frame composed of a magnetizable material, said device comprising:

a rubber-like support member configured to define and attached to a border surrounding the windshield completely;

said support member being substantially planar on both surfaces thereof;

b. a retroreflective means disposed on one surface of the said support member; and

c. a plurality of magnets of the said support member and imbedded in the surface of the support member opposite to the surface on which said light retroreflective means is disposed;

said plurality of magnets being imbedded in recesses spaced apart along the surface of said support member;

said magnets being so disposed so as to be flush with the surface of said support member opposite the retroreflective means.

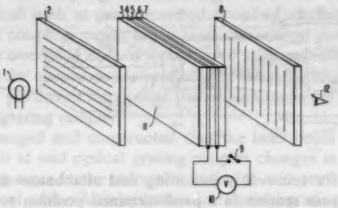
4,047,803

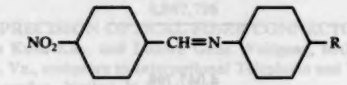
NEMATIC LIQUID CRYSTAL COMPOSITIONS

Masachika Yaguchi, Yokohama; Toshio Jinnai, Kamakura; Shirotsuka, Mikio, Kamakura, and Kazuo Totani, Kamakura, all of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 463,228, April 23, 1974, Pat. No. 3,988,054. This application July 8, 1976, Ser. No. 703,335
Claims priority, application Japan, Apr. 24, 1973, 48-46543; June 30, 1973, 48-73325
Int. Cl.² G02F 1/13; C09K 3/34; C07C 119/10
U.S. Cl. 350—160 LC **2 Claims**

1. A nematic liquid crystal material having positive dielectric anisotropy consisting of a compound represented by the formula





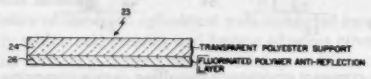
wherein R is n-alkyl group of 7 to 15 carbon atoms.

4,047,804

ANTI-REFLECTION COATINGS FOR PHOTOGRAPHIC BASES

Robert K. Stephens, Windham, N.H., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 428,400, Dec. 26, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,236
Int. Cl.² B32B 7/02, 27/00
U.S. Cl. 350—164 **22 Claims**



1. A transparent element comprising a polymeric film base having an index of refraction of at least 1.6, said polymeric film base carrying on one surface thereof a quarter-wave anti-reflection coating having an index of refraction at least about 0.20 less than said polymeric film base and an optical thickness of about 0.08 to about 0.2 micron, said anti-reflection coating comprising a fluorinated polymer and a polydimethyl siloxane in a quantity approximately 0.2 to 4 percent by weight of said anti-reflection coating, said polydimethyl siloxane having a viscosity of about 10,000 to 100,000 centistokes.

4,047,805

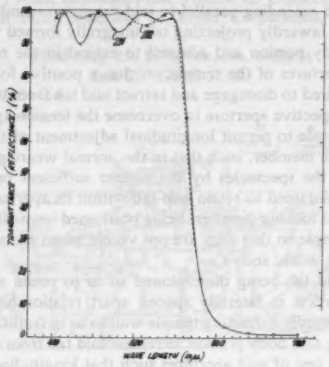
RIPPLE-FREE DICHROIC MIRRORS

Nobuyuki Sekimura, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 440,029, Feb. 6, 1974, abandoned. This application July 23, 1975, Ser. No. 598,219
Claims priority, application Japan, Feb. 14, 1973, 48-18139
Int. Cl.² G02B 5/28, 27/14
U.S. Cl. 350—166 **18 Claims**

1. A dichroic mirror, in which ripple is eliminated, consisting of a substrate and 10-layer films coated over said substrate, said substrate having an index of refraction of 1.52, and said 10-layer films being composed of alterating layers of a high index material having an index of refraction of 2.20 and a low index material having an index refraction of 1.38, and the layer contacting with said substrate is a high index material, said high index layers each having a basic design optical thickness of $\frac{1}{4}\lambda_o$, and said low index layers each having a basic design optical thickness of $\frac{1}{4}\lambda_o$, wherein λ_o is a design wave length in air, whereby the first, the second and the outermost layers counting from the substrate have optical thickness slightly

deviated from the corresponding basic optical thickness, the optical thickness of said first layer is $(2.85/4)\ \lambda_o$, the optical



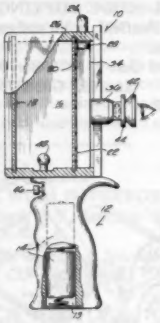
thickness of said second layer is $(0.8/4)\ \lambda_o$, and the optical thickness of said outermost layers if $(1.6/4)\ \lambda_o$.

4,047,806

HAND HELD MICROFICHE VIEWER

Jean-Pierre Puel, Paris, France, assignor to Realist, Inc., Menomonee Falls, Wis.

Filed June 11, 1976, Ser. No. 695,074
Int. Cl.² G02B 27/02
U.S. Cl. 350—236 **4 Claims**



1. A microfiche reader comprising a housing having a rectangular lenticular light gathering panel at the rear of the housing to gather ambient light and transmit it to the interior of the housing, the long dimension of the panel being vertical,

the front of said housing having a vertically elongated aperture therein,

a rectangular light diffusing glass panel mounted in the interior of the housing in the proximity of the front of the housing adjacent the aperture and parallel to the light gathering panel,

a slot in each side of the housing immediately ahead of the light diffusing glass and dimensioned to receive and guide a microfiche card for movement transversely to the housing and of said aperture so as to position any desired column of images on the card in alignment with said aperture while confining the card around the perimeter of the aperture to hold the card flat,

a lensboard movably mounted on the front panel,

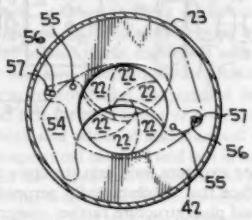
a viewing lens mounted on the lensboard in alignment with said aperture and positionable in alignment with any desired row of a microfiche card positioned in said slots.

4,047,807

DIAPHRAGM DEVICE

Yukio Okano, Minamikawachi; Nobuyuki Kita, Osaka, and Kyozo Uesugi, Izumi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Dec. 24, 1975, Ser. No. 644,320
Claims priority, application Japan, Dec. 26, 1974, 49-148439; Dec. 26, 1974, 49-148440
Int. Cl.² G03B 9/02
U.S. Cl. 350—266 **18 Claims**



1. A diaphragm device, comprising:

base plate means having a central opening of substantially circular shape;

first diaphragm blades each mounted on said base plate means in partially overlapping relation to form a diaphragm aperture defined by inner peripheral edges thereof each having a curved identical profile, said first blades each being mounted for pivotal movement through a predetermined angle to define said aperture of a predetermined size;

a pair of second diaphragm blades disposed opposite one another relative to the center of the opening in said base plate means, said second blades being mounted on said base plate means in partially overlapping relation to said first blades, and said second blades each being mounted for pivotal movement through an angle greater than said predetermined angle so that the inner peripheries of said second blades may shield part of the aperture defined by said inner peripheries of said first blades to thereby reduce said predetermined size of said aperture, said inner peripheries of said second blades each having a curved identical profile;

means engaging each of said blades for pivoting them to vary the size of the diaphragm aperture, said means which engage said second blades causing them, when it is desired to reduce said predetermined size of said aperture, to pivot further than said first blades are caused to thereby pivot so as to define a part of said aperture, whereby said peripheral edges of said second blades defines with a portion of said peripheral edges of said first blades an elongated aperture by reason of the opposed relation of said second blades and their greater angular movement.

4,047,808

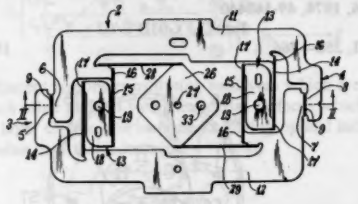
ADJUSTABLE SLIT MECHANISM

Ivan Robert Bartlett, East Burwood, Australia, assignor to Varian Techtron Proprietary Limited, North Springvale, Australia

Filed Aug. 5, 1976, Ser. No. 711,349
Claims priority, application Australia, Aug. 13, 1975, 2769/75
Int. Cl.² G01J 3/04; G05D 25/00
U.S. Cl. 350—271 **12 Claims**

1. An optical slit device comprising a generally planar plate structure, said plate structure being elongate along a longitudinal axis and having first and second jaw assemblies, said first jaw assembly being disposed near one end of said plate structure and said second jaw assembly being disposed near the other end of said plate structure along said longitudinal axis, each of said jaw assemblies including two jaw sections arranged to define a slit between opposed edges of respective

parts of the plate structure from which said jaw sections are formed, and flexible hinge means interconnecting the two jaw sections of each jaw assembly so as to permit relative movement between said jaw sections such that the width of said slit can be changed; each hinge means including an elongate arm structure oriented generally transverse to said longitudinal axis



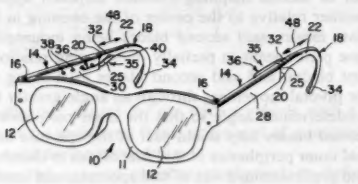
of said plate structure, said arm structure having a generally planar surface that is substantially perpendicular to said jaw sections; said plate structure further comprising two bridging portions, each of said bridging portions connecting a jaw section of one of said jaw assemblies with a jaw section of the other of said jaw assemblies.

4,047,809

SPECTACLES HAVING ADJUSTABLE TEMPLES

Joyce L. Zuccatti, 9411 Lee Highway 713, Fairfax, Va. 22030

Filed May 24, 1976, Ser. No. 689,566
Int. Cl.[2] G02C *5/20*
U.S. Cl. 351—118 **3 Claims**



1. Spectacles comprising:

A. a frame;

B. temples each of which has one end pivotally connected to said frame and an oppositely disposed free end with an inwardly extending temple wall extending intermediate said ends;

C. extension means cooperatively associated with each free end of said temples, said extension means comprising a pair of extension members;

D. guiding means to permit slidable movement of said extension members relative to its temple during adjustment to its various positions, said guiding means providing each extension member and a respective temple to be interfitted one within the other and being slidable and longitudinally adjustable relative to its temple;

E. said guiding means is constituted by a channel in said temples, and said extension member is retractable inwardly and outwardly of and interfitting with the companion channel in the temple;

F. locking means for releasably securing said extension members in longitudinally adjusted positions relative to their companion temple, said locking means include a locking member for bridging between and interconnecting the extension member and temple;

G. said locking means includes a plurality of apertures in spaced apart relation to each other positioned on said inwardly extending temple wall; and

H. said locking member includes:

1. an inwardly extending arm at one end thereof,

2. means for firmly securing to the extension member said arm,

3. a flexible body portion integrally formed with said arm and extending parallel to said extension member,

4. an inwardly projecting tab integrally formed with said body portion and adapted to extend in the respective apertures of the temple, so that a positive force is required to disengage and retract said tab from within the respective aperture to overcome the tension against the temple to permit longitudinal adjustment of the extension member, such that in the normal wearing position of the spectacles by the wearer sufficient pressure is maintained to retain said tab within its aperture,

5. said locking members being positioned inwardly of each temple so that they are not visible when the spectacles are worn, and

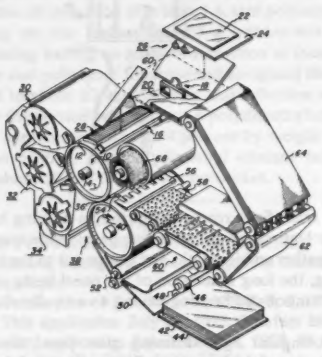
6. said tab being dimensioned so as to retain said body portion in laterally spaced apart relationship to said inwardly extending temple wall so as to facilitate grasping said body portion to release said tab from a particular one of said apertures such that longitudinal adjustment of said extension member relative to a respective one of said temples may be obtained.

4,047,810

DUAL MODE COPYING MACHINE

Paul F. Morgan, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 9, 1975, Ser. No. 620,979
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—3 R **23 Claims**



1. An apparatus for recording a latent image of an original document on a photosensitive member, including:

a deformable transparent member;

means for projecting a light image of the original document through said transparent member onto the photosensitive member to record the latent image thereon;

means for deforming restorably said transparent member to form a pattern of spaced deformations therein which phase shifts the light image passing therethrough with respect to the light image passing through the non-deformed portions thereof so as to modulate the light image transmitted to the photosensitive member; and

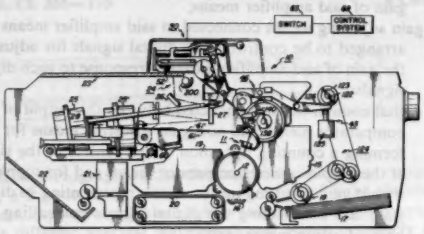
means for actuating selectably said deforming means.

4,047,811

AVAILABLE LIGHT MARGINAL ILLUMINATION SYSTEM

Robert F. Allis, Rochester, and Vincent A. Capaccio, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 27, 1976, Ser. No. 690,474
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 20 Claims



1. In a reproducing apparatus including means for forming an image on a sheet of final support material, said image forming means including means for viewing an object and for projecting an image thereof onto a photosensitive surface selectively at a first copy image magnification or at a second copy image magnification which is reduced as compared to said first copy image magnification, said viewing means including means for illuminating said object; said photosensitive surface being arranged for movement in a given direction; and further including means responsive to the selection of said second projected image magnification for illuminating at least one unused side margin region of said photosensitive surface, said side margin region being of greatest extent substantially in said given direction; the improvement wherein said means for illuminating said side margin region comprises:

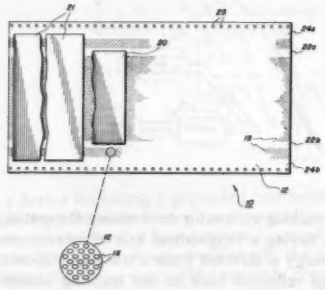
means selectively operable in response to said second magnification selection for intercepting a portion of the illumination derived from said illumination means and for applying said portion of said illumination to said side margin.

4,047,812

DOCUMENT BELT WITH IMPERFORATE BANDS

James W. Hogan, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 15, 1976, Ser. No. 649,174
Int. Cl.[2] G03B *27/62*
U.S. Cl. 355—76 4 Claims



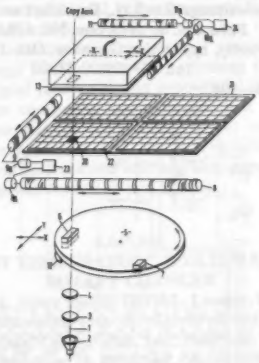
1. In a vacuum belt document transport system wherein documents are transported by and copied on a vacuum belt closely overlying a platen imaging station, including means for moving said documents in a predetermined movement direction on said vacuum belt, wherein said vacuum belt has a multiplicity of fine apertures extending substantially uniformly thereover to hold said documents against said belt substantially uniformly by vacuum forces exerted through said apertures, wherein said vacuum belt is wider than said documents transverse said movement direction, wherein said documents include at least two different standard documents of two different preselected standard edge-to-edge dimensions extending transverse said movement direction, and wherein said belt provides an image background around said documents to reduce edge show-around in the copying of said documents, the improvement wherein said vacuum belt has at least three narrow unapertured areas extending linearly in said movement direction of said belt, said unapertured areas being parallel imperforate bands spaced apart from one another by distances between the centers of said bands transverse said movement direction equal to said two standard dimensions of said two standard documents to provide an unapertured image background area of said belt for both edges of both said standard documents, with both said edges of said standard documents lying within said unapertured bands of said belt in said imaging station, and wherein the dimensions of said unapertured bands transverse said movement direction are only a minor portion of said standard dimension of said standard document and minor areas of said vacuum belt, and wherein substantially the entire major area of the vacuum belt between all three of said unapertured bands is fully apertured to provide said vacuum holding of said documents to said belt.

4,047,813

AUTO EDITORS

Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia (6062)

Filed July 28, 1975, Ser. No. 599,586
Claims priority, application Australia, July 29, 1974, 8365/74; Nov. 21, 1974, 9705/74
Int. Cl.[2] G03B *27/04*
U.S. Cl. 355—95 5 Claims



1. A microfiche or microfilm editing device comprising a light source, a means of focussing light from the source along a copy axis through a first microfiche or microfilm held in a frame, a first x actuator connected to the frame arranged to move the frame in an x direction and a first y actuator connected to the frame arranged to move the frame in a y direction, means for driving the first actuators according to a set program, holding means for a second microfiche, said holding means arranged to hold the second microfiche in close relationship to the first microfiche or microfilm, a second *x* actuator and second *y* actuator connected to the holding means and arranged to move the holding means in *x* and *y* directions respectively, means for driving the second actuators according to another set program.

4,047,814

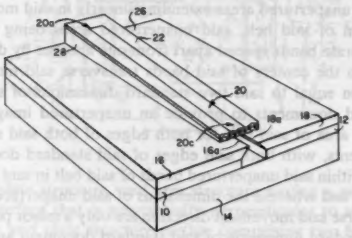
METHOD AND APPARATUS FOR SEGREGATING PARTICULATE MATTER

Vernon C. Westcott, Lincoln, Mass., assignor to Trans-Sonics, Incorporated, Burlington, Mass.

Continuation of Ser. No. 446,547, Feb. 27, 1974, abandoned, which is a continuation of Ser. No. 176,419, Aug. 25, 1971, abandoned. This application Nov. 11, 1975, Ser. No. 631,171

Int. Cl.[2] G01N *1/00, 33/28*

U.S. Cl. 356—38 **47 Claims**



1. A method of classifying hyperfine particles in a fluid medium according to their size, comprising the steps of:

A. positioning a substrate within a force field having a component of relatively high intensity extending orthogonal to a flow-supporting surface of said substrate and attracting toward said surface particles adjacent said surface;

B. flowing a particle-containing fluid medium along an extended path on said substrate surface of interaction with said field whereby the field precipitates particles onto said substrate according to their size, the larger particles first.

4,047,815

MEASUREMENT OF STANDARD VISUAL RANGE

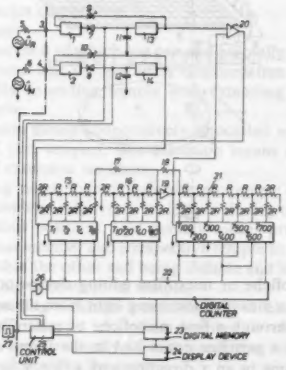
Herbert Sedlacek, Hamburg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Oct. 8, 1975, Ser. No. 620,911

Claims priority, application Germany, Oct. 10, 1974, 2448274

Int. Cl.[2] G01N *21/00*

U.S. Cl. 356—104 **6 Claims**



1. In apparatus for use in a system producing pulses of light and introducing the light into a scattering volume where the light is scattered, which apparatus serves to determine the standard visual range in an atmosphere corresponding to the scattering volume, and includes electro-optical measured signal producing means connected for monitoring the light scattered in the scattering volume and producing a measured signal representative of the amount of scattering, means for producing a reference signal, and comparator means having two inputs and an output, the improvement wherein said apparatus further comprises:

means connecting one input of said comparator means to one of said signal producing means;

variable-gain amplifier means connected between the other of said signal producing means and the other input of said comparator means for applying to said other comparator means input a signal whose value is a function of the signal produced by said other signal producing means and the gain of said amplifier means;

gain adjusting means connected to said amplifier means and arranged to be controlled by digital signals for adjusting the gain of said amplifier means in response to such digital signals;

digital counter means connected between the output of said comparator means and said gain adjusting means for performing a counting operation under control of the signal at the output of said comparator means and for supplying to said gain adjusting means signals representing its digital state and constituting the digital signals controlling said gain adjusting means; and

indicator means connected to said counter means for providing a visible indication of the count state of said counter means.

4,047,816

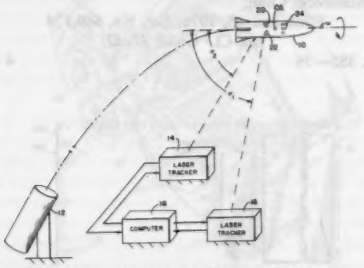
ATTITUDE DETERMINATION USING TWO TRANSMITTER/RECEIVER STATIONS AND SKEWED REFLECTORS

Kynric M. Pell, Laramie, Wyo., and David B. Brown, Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 18, 1976, Ser. No. 697,308

Int. Cl.[2] G01B *11/26*

U.S. Cl. 356—152 **6 Claims**

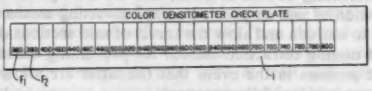


1. In a tracking system for determining the spatial attitude of an object having a longitudinal axis of rotation and wherein optical energy is directed from a tracking station toward the object and reflected back to the tracking station from the object, the improvement of first and second optical reflectors disposed on the surface of said object, said reflectors being disposed respectively along first and second axes skewed to each other for retroreflecting impinging optical energy within the respective planes formed by the normal to the surface of the object at each reflector and said first and second reflector axes respectively.

4,047,817
PHOTOGRAPHIC COLOR DENSITOMETER CHECK PLATE

Hirobumi Enomoto, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 18, 1974, Ser. No. 507,113
Claims priority, application Japan, Sept. 18, 1973, 48-108903[U]
Int. Cl.[2] G01J 3/46
U.S. Cl. 356—175 4 Claims

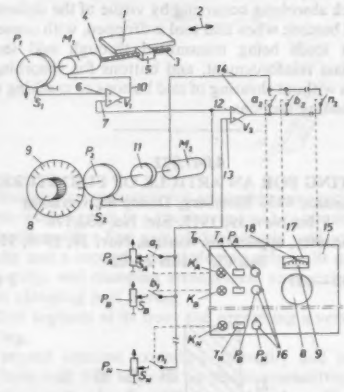


1. A photographic color densitometer check plate comprising a support having thereon a plurality of light absorbing filters, each of which has a light transmission limit wavelength at a different spectral wavelength and which comletely and sharply absorbs light of a wavelength shorter than the wavelength of the light transmission limit wavelength said light transmission limit wavelength being defined as the mid-point of the wavelength corresponding to 5% and 72% of the curves of the transmission factor of the filters, said filters having light transmission limit wavelengths which are equally spaced over the wavelength region of the densitometer check plate.

4,047,818
FILTER REGULATOR FOR MICROSPECTROPHOTOMETER

Alfred Steinbatz, Vienna, Austria, assignor to C. Reichert Optische Werke, AG, Vienna, Austria

Filed Oct. 28, 1975, Ser. No. 626,440
Claims priority, application Austria, Oct. 14, 1974, 8221/74
Int. Cl.[2] G01J 3/48
U.S. Cl. 356—189 2 Claims

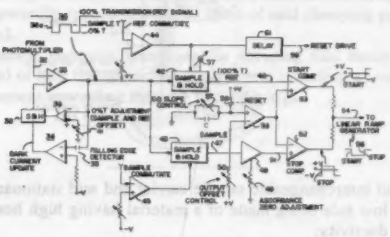


1. In a device for setting a graduated interference filter of a microspectrophotometer having an electrically operable adjustment means controlled by a graduated control knob (8) for setting the filter to a chosen wavelength, the improvement comprising a first drive motor (M_1) operably connected to the filter, a first follower control circuit including a first differential amplifier (V_1) having an output connected to the drive motor, an input (6) of the first differential amplifier being connected to a signal generator (P_1) responsive to movement of the interference filter and another input (7) connected to a nominal signal generator (P_2) responsive to movement of the control knob, a second drive motor (M_2) selectively connectable to said control knob (8), a second follower control circuit including a second differential amplifier (V_2), one input of the second amplifier (V_2) being connected to said nominal signal generator (P_2), another input of the second amplifier (V_2) being selectively connectable to one of a plurality of adjustable signal generators (P_A, P_B . . . P_N), an output of said second amplifier being operably connected to said second drive motor (M_2) whereby one of a plurality of predetermined settings of said filter can be chosen by activating one of said adjustable signal generators and other settings of said filter can be chosen by manually moving control knob (8).

4,047,819
APPARATUS FOR MEASURING OPTICAL DENSITY WITH STRAY LIGHT COMPENSATION

Paul R. Goldberg, Palo Alto, Calif., assignor to SmithKline Instruments, Inc., Sunnyvale, Calif.

Filed Apr. 10, 1975, Ser. No. 566,928
Int. Cl.[2] G01N 21/22; G01J 3/42, 1/42
U.S. Cl. 356—205 8 Claims



1. Apparatus for measuring the optical density of a sample comprising: electro-optical means for measuring the light attenuating properties of said sample and producing a signal indicative of said attenuation, including a radiation source and detector to detect radiation transmitted through said sample and produce a sample signal; reference means for producing a reference signal including means for detecting radiation from said source; a resistive-capacitive circuit providing an exponential discharge voltage; means for adjusting the dc level of said sample signal relative to said exponential discharge voltage; means for comparing said reference and sample signal with the exponential discharge voltage of said resistive-capacitive circuit for producing start and stop signals respectively, the time interval between said start and stop signal being indicative of the optical density of said sample.

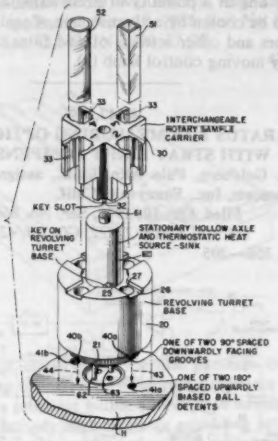
4,047,820
CONSTANT TEMPERATURE, MULTIPLE SAMPLE, ROTARY CHANGER

Charles Soodak, Silver Spring; David L. Lessner, Baltimore, and James H. Macemon, Glen Burnie, all of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed May 19, 1976, Ser. No. 687,883
Int. Cl.[2] G01N 21/16
U.S. Cl. 356—244 10 Claims

1. In a constant temperature sample changer for multiple samples contained in sample containers:
- a hollow stationary axle;
- a revolving turret base mounted on said stationary hollow axle for rotation thereon;
- means to index said revolving turret base to any of a sequence of angular orientations;
- a readily removable interchangeable sample carrier mounted on said stationary hollow axle for rotation thereon adjacent said turret base;
- means to unambiguously key said interchangeable sample carrier to said revolving turret base, whereby, when said revolving turret base is indexed, said interchangeable rotary sample carrier is correspondingly indexed;

said interchangeable sample carrier having receivers of shape adapted to receive said sample containers, said receivers being located angularly about said interchangeable sample carrier at positions correspondingly to said sequence of angular orientations;


INTERCHANGEABLE ROTARY SAMPLE CARRIER
KEY SLOT
KEY ON REVOLVING TURRET BASE
STATIONARY HOLLOW AXLE AND THERMOSTATIC HEAT SOURCE - SINK
REVOLVING TURRET BASE
ONE OF TWO 90° SPACED DOWNWARDLY FACING GROOVES
ONE OF TWO 180° SPACED UPWARDLY BIASED BALL DETENTS

said interchangeable sample carrier and said stationary hollow axle being made of a material having high heat conductivity;

means to maintain said stationary hollow axle at a constant temperature, whereby, by means of heat conduction, said containers of samples are thermostated to the temperature of said stationary hollow axle.

4,047,821

BREAK-RESISTANT TELESCOPING TOOL

Jack B. Hoke; Richard Graham, both of Centralia, and Richard H. Hoffman, Moberly, all of Mo., assignors to A. B. Chance Company, Centralia, Mo.

Continuation of Ser. No. 558,433, March 14, 1975, abandoned. This application Oct. 13, 1976, Ser. No. 732,056
Int. Cl.[2] F16B *7/10*
U.S. Cl. 403—109 **3 Claims**

1. In an extensible telescoping tool:

a plurality of elongated, tubular, axially reciprocable, telescopically interfitted sections formed of a fiberglass reinforced synthetic resin material,

each of said sections being configured and arranged relative to each adjacent section to assure a smooth, sliding fit therebetween;

means secured to each nestable section for substantially precluding airflow therethrough upon axial, nesting retraction thereof into the adjacent, surrounding section, and for diverting said airflow externally of the nestable section for passage thereof between the latter and said surrounding section,

the interfitting of said sections, and the configuration and location of said air precluding and diverting means, serving to cushion and slow the travel of said sections during said nesting retraction thereof for preventing damage to said sections in the event that the latter are allowed to retract in a free-falling manner;

means for releasably securing said sections in an axially and rotationally locked, extended position relative to each other to stabilize said sections against normally experienced tensile, compressive and torsional loads,

said securing means including an elongated, shiftable, generally transversely oriented button having a shank portion and situated within each of said nestable sections, and means biasing the respective buttons outwardly relative to the corresponding sections, there being a button-receiving aperture in each of said surrounding sections which extends through the sidewall and fiberglass reinforcement thereof for receiving a corresponding button, with the shank of the latter engaging the opening-defining walls of said section,

each of said buttons having the shank portion thereof formed of a shear resistant, deformable synthetic resin material having a ¼ inch notched Izod impact strength of from about 10 to 20 ft. lb./in.,

said deformable shank portions, and the corresponding surrounding sections and fiberglass reinforcement thereof, being cooperable for absorbing potentially destructive shocks developed when the tool is in an extended position and is dropped on its end,

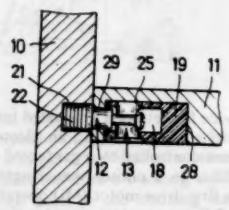
said shock absorbing occurring by virtue of the deformation of said buttons when said tool is dropped, with consequent impact loads being transmitted through said sections, fiberglass reinforcement, and buttons for absorbing said shocks without shearing of said buttons or cracking of said surrounding sections.

4,047,822

FITTING FOR AN ARTICLE OF FURNITURE

Oskar Lehmann, 4933 Blomberg, Donop 85, Germany

Filed Nov. 19, 1975, Ser. No. 633,176
Claims priority, application Austria, Nov. 29, 1974, 9569/74
Int. Cl.[2] F16B *21/02*
U.S. Cl. 403—187 **3 Claims**



1. A fitting for detachably interconnecting two walls of an item of furniture at an angle to one another, comprising a bearing body locatable in a recess in a first of said walls, said bearing body having two bores formed therein extending at an angle to one another, said bores communicating one with the other, a torsion bolt rotatably journalled in the first of said

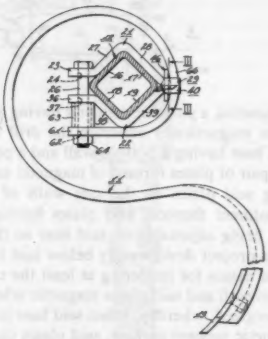
bores and carrying, on one of its end faces, tool receiving means, said torsion bolt having an external surface, said external surface being channelled to form a first groove, and a tightening bolt locatable in the second of said bores in said bearing body, said tightening bolt comprising a securing portion engageable in the second of said walls, a guide portion engaging at least partially in said second bore and a head portion, said head portion co-operating with the surface and at least a part of the perimeter of said grooves in said torsion bolt, whereby said co-operation draws said head of said tightening bolt into said bearing body causing said two walls to be connected and causing said tightening bolt to be locked in position relative to said bearing body, said torsion bolt being provided with a projection extending laterally from the end region of said torsion bolt provided with said tool receiving means, said bearing body being provided with at least one upstanding projecting portion around the periphery of said bore receiving said torsion bolt whereby said projection on said torsion bolt co-operates with said at least one upstanding projecting portion formed on said bearing body to limit rotation of said torsion bolt in said bore.

4,047,823

CLAMPING ARRANGEMENT FOR A FLEXIBLE EARTH-WORKING TINE

John W. Mydels, LaPorte, Ind., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 7, 1976, Ser. No. 721,104
Int. Cl.² F16B *7/04*; A01B *15/00*
U.S. Cl. 403—188 **14 Claims**



1. Clamping arrangement for releasably connecting a flexible earth-working tine to a transverse tool bar of quadrangular cross section with a first pair of sloping side walls converging upwardly and a second pair of sloping side walls converging downwardly, said clamping arrangement comprising:

a first clamping part having

a first segment at its front end presenting a vertical opening,

a second segment extending upwardly and rearwardly from said first segment in thrust transmitting engagement with one of said first pair of side walls,

a third segment extending downwardly and rearwardly from said second segment in thrust transmitting engagement with the other of said first pair of side walls, and

a rear segment having a pair of transversely spaced fingers defining a rearwardly opening notch;

a second clamping part having

a first portion at its front end presenting a vertical opening in alignment with said vertical opening in said first clamping member,

a second portion extending downwardly and rearwardly from said first portion in thrust transmitting engagement with one of said second pair of said walls,

a third portion extending upwardly and rearwardly from said second portion in thrust transmitting engagement with the other of said second pair of side walls, and

a rear portion having a pair of transversely spaced fingers defining a rearwardly opening notch in vertically aligned relation with said notch on said rear segment of said first clamping part;

a keeper element having a downwardly facing surface in thrust transmitting engagement with the top side of said rear segment of said first clamping part and an upwardly facing surface in thrust transmitting engagement with the bottom side of said rear portion of said second clamping part;

a mounting end of said tine presenting a vertical opening in alignment with said vertical openings in said clamping parts;

a curved sector on said tine extending from said mounting end rearwardly beneath said second clamping part thence upwardly through said notches and between said pairs of fingers thence forwardly in upwardly spaced relation over the top of said first clamping part thence downwardly in forwardly spaced relation in front of said clamping parts; and,

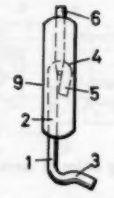
releasable fastening means rigidly securing said mounting end of said tine to said clamping parts including a tension element extending through said openings.

4,047,824

HOOK AND CORD CONNECTION

Manfred Brokmann, Silcherstr. 5; Kurt Sanders, Friedrichstr. 29; Dieter Sanders, Haneschweg 2, and Hermann Westhoff, Augustenburgerstr. 85a, all of Osnabrueck, Germany

Filed Mar. 31, 1976, Ser. No. 672,240
Claims priority, application Germany, Apr. 18, 1975, 2517188
Int. Cl.² A47C *23/22*
U.S. Cl. 403—209 **1 Claim**



1. A connection between a metal wire hook and a cord of synthetic fiber material, comprising

a metal wire having a plastically deformed bent U-shaped portion with a free end, said bent portion spanning an angle exceeding 180° and having a pair of converging shanks which define a clearance space therebetween;

a cord having an unsqueezed cross-sectional area, said cord extending through said clearance space with its free end folded over, the portion of said cord being squeezed so that its cross-sectional area is reduced;

said bent portion of said metal wire is U-shaped and said pair of shanks converge, the maximum width of said clearance space in the bent portion being substantially less than the diameter of said unsqueezed cross-sectional area of said cord;

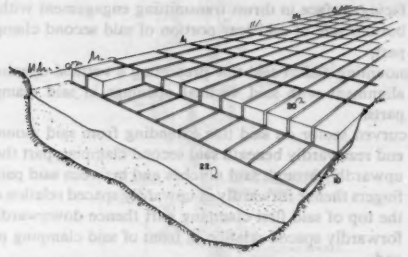
at least said bent portion of said metal wire and said squeezed portion and free end of said cord are cast into a sheathing of thermoplastic material and impregnated thereby.

4,047,825

ROLLABLE WALK GUIDE

Robert O. Lundahl, Brethren, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed June 14, 1976, Ser. No. 695,593
Int. Cl.[2] E01C *5/08, 11/16*
U.S. Cl. 404—70 **2 Claims**



1. A rectangular open continuous grid of wire elements which is initially formed as a roll, with the grid shaped of uniformly spaced parallel longitudinal members joined to uniformly spaced parallel lateral members that bound uniform rectangular openings, each opening of the general size of the outline of a brick, together with

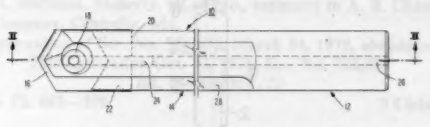
pointed projections perpendicularly mounted at intervals to the members, and projecting from one side of the grid, said projections serving as means to anchor the grid to a flat base upon which it is laid.

4,047,826

DRILL HAVING INDEXABLE REPLACEABLE INSERT TIP

John T. Bennett, 137 Ridgewood Circle, Downingtown, Pa. 19335

Filed May 17, 1976, Ser. No. 686,935
Int. Cl.[2] B23B *27/10*
U.S. Cl. 408—59 **5 Claims**



1. A drill for forming holes in metal with a high degree of precision, comprising:

a shank portion and an elongate, cylindrical body portion, having a passage extending axially therethrough, said body portion further having an axial slot in one end thereof, said slot having a bottom surface which extends perpendicularly to the axis of the body;

a threaded screw extending across said slot and across the longitudinal axis of the body for drawing the sides of the slot together;

a replaceable insert disposed in said slot and being indexable about said fastening means, said insert having a pair of parallel planar opposed faces, a pair of opposed ends, at least one of said ends having two angularly displaced cutting lips each lying at a lip relief angle to one of said faces, said insert further having a pair of opposed side edges extending between said opposed ends, said side edges being configured to provide non-interfering clearance with the walls of a hole formed by said cutting lips;

said passage having a diameter greater than the thickness of the insert and extending into said slot for conducting coolant along both sides of the insert to at least the center thereof; and

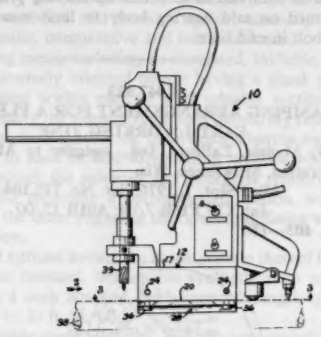
seating means comprising a separable, planar anvil having lateral edges and a first, substantially straight edge adapted to seat in the bottom of said slot; a locating tang projecting from said straight edge for engaging said axial passage, and a generally V-shaped indented edge opposite said flat edge forming a recess for receiving one of said opposed ends of said insert, the lateral edges of said anvil protruding from either side of said drill body to substantially equal the width of said insert to comprise wear pads for stabilizing the drill.

4,047,827

ACCESSORY SUPPORT PLATES FOR A MAGNET BASE DRILL

Everett D. Hougen, G-5072 Corunna Road, Flint, Mich. 48504

Filed Nov. 26, 1976, Ser. No. 745,393
Int. Cl.[2] B23B *39/00*
U.S. Cl. 408—76 **12 Claims**



1. In combination, a portable drill unit having an electromagnetic base for magnetically adhering the drill to a magnetic support, said base having a bottom wall and a pair of opposite side walls, a pair of plates formed of magnetic material, means for mounting said plates on the side walls of said base for vertical adjustment thereon, said plates having lower edge portions and being adjustable on said base so that said lower edge portions project downwardly below said bottom wall of said base, and means for rendering at least the central portion of said bottom wall and said plates magnetic when the electromagnet is energized, whereby, when said base is mounted on a convex magnetic support surface, said plates can be extended downwardly to a position wherein the lower edge portions thereof engage portions of said support surface at locations spaced laterally outwardly on opposite sides from the central portion of said base to thereby magnetically adhere the drill on said support in a stable position when the electromagnet is energized.

4,047,828

CORE DRILL

Joseph E. Makely, 889 Colony Way, Worthington, OhioIO 43085

Filed Mar. 31, 1976, Ser. No. 672,475
Int. Cl.[2] B23B *27/20;* B28D *5/02*
U.S. Cl. 408—145 **4 Claims**

1. A core drill comprising:

a. a rigid hollow tube;

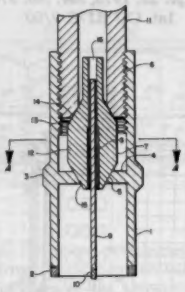
1. having one end terminating in a bonded abrasive aggregate;

2. having the other end threaded on the interior to correspond to the external threads on a hollow rotatable member; and

3. having within its interior intermediate the ends a circular shoulder;

b. a hollow cylindrical collet shaped at one end to rest upon

said shoulder of (a) and having means at the other end to fit within said rotatable member, said collet cooperating with said shoulder to thereby clamp a drill; and



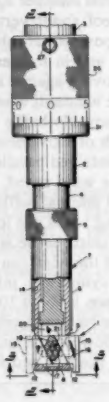
c. a rod-like drill terminating at one end in an abrasive aggregate and positioned at the other end in said collet.

4,047,829

ADJUSTABLE FLOATING REAMER

Milton Lloyd Benjamin, and Wilbur Nelson Miles, both of Chagrin Falls, Ohio, assignors to Erickson Tool Company, Solon, Ohio

Filed May 19, 1976, Ser. No. 687,667
Int. Cl.² B23B *29/034*
U.S. Cl. 408—169 **4 Claims**



1. An adjustable reamer comprising an elongated slender cylindrical shank member having a slot diametrically across one end; a closure cap having a closed end adjacent said one end and having an integral elongated thin tubular portion having an inside diameter closely embracing said shank member from said one end axially beyond the bottom of said slot; a nut rotatable on said shank member and having threaded engagement with the end of said tubular portion remote from said closed end to tighten said closed end against said one end; a pair of juxtaposed reamer blades radially slidable in said slot as closed by said cap and extending radially through openings in said tubular portion with cutting edges at their outer extremities; said shank member having cam means engaged with said blades to move the latter simultaneously radially inward or outward in opposite directions to adjust the distance between said cutting edges; said tubular portion supporting said shank member against spreading apart of said slot by torque load imposed on said blades at said cutting edges.

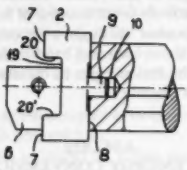
3. An adjustable reamer comprising an elongated cylindrical shank member having a slot diametrically across on end; a closure cap having a closed end adjacent said one end and having an elongated tubular portion closely embracing said shank member; a nut rotatable on said shank member and having threaded engagement with the end of said tubular portion remote from said closed end to tighten said closed end against said one end; a pair of juxtaposed reamer blades radially slidable in said slot as closed by said cap and extending radially through openings in said tubular portion with cutting edges at their outer extremities; said shank member having cam means engaged with said blades to move the latter simultaneously radially inward or outward in opposite directions to adjust the distance between said cutting edges; said cam means including an elongated actuator axially reciprocable in a bore in said shank member and having one end in camming engagement with said blades and having the other end axially beyond said nut; and screw means rotatable on said shank member and operatively connected with said other end of said actuator to move the latter axially in either direction; said actuator having radial clearance with said shank member bore and a pivotal connection at said other end to permit bodily radial floating movement of said blades when said blades enter a drilled hole in a workpiece which is eccentric with respect to the longitudinal axis of said shank member.

4,047,830

DRILLING TOOL

Heinrich Kruger, Essen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed May 12, 1976, Ser. No. 685,919
Claims priority, application Germany, May 26, 1975, 2523201
Int. Cl.² B23B *31/10, 51/00, 27/14*
U.S. Cl. 408—239 A **13 Claims**

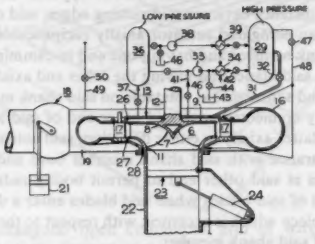


1. In a drilling tool, particularly for working metals, including a tool holder having a receiving slot which is open on three sides formed in its end surface, an interchangeable blade type drill bit inserted in said slot, and means for fastening said drill bit in said slot, the improvement comprising a bar-shaped adapter symmetrically disposed in said receiving slot between said drill bit and the bottom surface of said receiving slot, said adapter extending laterally beyond the periphery of said tool holder for a distance equal to or slightly less than the lateral expanse of said drill bit, said adpater having a first end surface which abuts said bottom surface of said receiving slot and a second opposite end surface which contacts and provides an abutment for at least the portions of the adjacent end surface of said blade shaped drill bit which extend beyond the periphery of said tool holder, said adjacent end surface of said drill bit being opposite the end surface thereof containing the cutting tip of the drill bit; a recess formed in the center of said second end surface of said adapter; and a mating protrusion formed on said adjacent end surface of said drill bit for centering said drill bit.

4,047,831
METHOD FOR REDUCING HYDRAULIC TURBINE SEAL TEMPERATURE WHILE TURBINE RUNNER IS ROTATING IN AIR

Howard A. Mayo, Jr., and Ignacy Swiecicki, both of York, Pa., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 631,487, Nov. 13, 1975, abandoned.
This application Feb. 14, 1977, Ser. No. 768,758
Int. Cl.[2] F04D *29/08, 29/58;* F01D *25/08*
U.S. Cl. 415—1 3 Claims



1. In a hydraulic turbine including a stationary portion defining a runner chamber with a runner supported therein and rotated by water flowing through a water intake valve acting on the runner, crown and band seals located between said runner and the stationary portion of said machine, said seals during normal operation being cooled by contact of said water, and wicket gates on the upstream side of said runner capable when in the closed position to substantially interrupt the flow of water into said chamber, said runner chamber being less than airtight, the method of rotating said runner and gas to reduce runner drag comprising the steps of:

a. closing said intake valve;

b. admitting a relatively large volume of high pressure gas to said runner chamber through a first passageway sufficient to depress the water from said chamber;

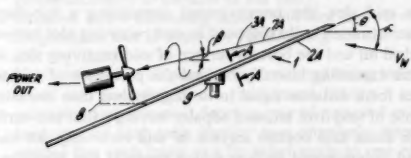
c. interrupting the flow of said relatively large volume of high pressure gas to said runner chamber; and

d. admitting a relatively small volume of high pressure gas to said runner chamber through a second passageway directly through the crown and band seals to cool said seals and replenish the leakage gas to maintain the desired gas pressure in said chamber.

4,047,832
FLUID FLOW ENERGY CONVERSION SYSTEMS

Pasquale M. Sforza, Huntington, N.Y., assignor to Polytechnic Institute of New York, Brooklyn, N.Y.

Filed Apr. 3, 1975, Ser. No. 564,681
Int. Cl.[2] F03D *1/04*
U.S. Cl. 415—1 33 Claims

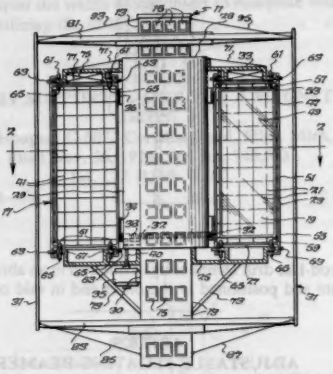


1. An energy conversion system for converting the energy of natural fluid flow as in winds or waterways, to useful output power comprising vortex generating means having a planar plate-like region adapted to intercept said natural fluid flow and to generate an edge separation vortex having a substantial axial velocity component, and turbine means positioned in the developed region of said vortex for extracting energy from said vortex.

4,047,833
HORIZONTAL WINDMILL

Bert J. Decker, 136 Capen Blvd., Buffalo, N.Y. 14226

Filed Apr. 23, 1975, Ser. No. 570,558
Int. Cl.[2] B27C *9/00*
U.S. Cl. 415—2 15 Claims



1. A horizontal windmill comprising a plurality of vanes, a substantially cylindrical internal baffle member fixedly mounted on and surrounding a vertical tower-shaped office building at a distance at least 10 meters above ground level, means for mounting and positioning the vanes about the substantially cylindrical baffle member for horizontal partial rotational movements thereof about vertical axes so as to place them in wind-resisting positions at substantially all times when moving with the wind and in feathered positions at substantially all times when moving against it, so as to promote horizontal revolution of the windmill when the wind blows, and a substantially vertical movable baffle which is straight sided, located outside the path of movements of the vanes and self-aligning so as to be maintained parallel to the direction of the wind, for increasing the wind speed, in conjunction with the substantially cylindrical internal baffle, as the wind is directed against the wind-resisting vanes, the location of which substantially vertical, straight sided baffle is such that the minimum free area through which the wind can flow between said baffle and the substantially cylindrical internal baffle, calculated without the vanes in place, is about 10 to 50% of the maximum of such free area and the rotating vanes are limited in travel by stop members which allow only about a 90° movement of the vanes between a radial position and a tangent position.

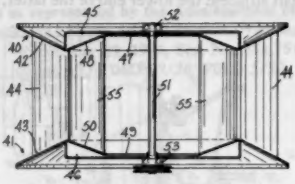
4,047,834
HORIZONTAL MULTIDIRECTIONAL TURBINE WINDMILL

George S. Magoveny, and Eric J. Forgo, both of North Haven, Conn., assignors to Windsunwatt, Inc., New Haven, Conn.

Continuation-in-part of Ser. No. 482,355, June 24, 1974, Pat. No. 3,938,907. This application Dec. 18, 1975, Ser. No. 642,240
Int. Cl.[2] F03D *7/06*
U.S. Cl. 415—3 5 Claims

1. A horizontal multidirectional windmill comprising a fixed housing and a rotor, the housing comprising upper and lower annular frusto-conic members and a plurality of vertically disposed vanes extending between said members and lying at an angle from radial, each adjacent pair of vanes and the surfaces of the frusto-conic members therebetween forming a laterally and vertically inwardly tapering funnel to direct air inwardly with a tangential component, and the rotor comprising upper and lower horizontally disposed central disc portions, the upper disc portion being bounded peripherally by an outwardly and downwardly extending upper frusto-conic member and the lower disc portion being bounded peripher-

ally by an outwardly and upwardly extending, lower frustoconic member, a vertical axle to which said disc portions are secured, and a plurality of buckets mounted between said last named frusto-conic portions and extending inwardly from the



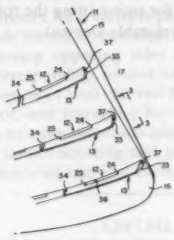
periphery thereof, the outer peripheries of said last named upper and lower frusto-conic members being disposed adjacent to the inner peripheries of the respective upper and lower fursto-conic members defining said tapered funnels.

4,047,835

HIGH EFFICIENCY PROPELLER

Arthur Charles Hornung, 3143 8th St., Boulder, Colo. 80302

Filed Aug. 2, 1976, Ser. No. 710,910
Int. Cl.[2] B63H *1/28*
U.S. Cl. 416—23 **5 Claims**



1. A high efficiency propeller which provides added surface contact with a propellant medium, namely water or air, which is prevented from slipping off of the ends of the propeller, thereby increasing the efficiency of the propelling force of a propeller, the device comprising, in combination:

conventional propeller blades;

a series of flanges integrally formed with the outside surface of the propeller blades, consisting of an inside surface integrally conjoined with the rear surface of said propeller blades, an outside surface, opposed side surfaces, and opposed end surfaces, with a series of flanges spaced apart in line laterally across the width of said rear surface and between said side surfaces respectively and longitudinally in line on said rear surface between said outside surface and the hub of a propeller, with further a round through hole provided in each flange running axially between said end surfaces and disposed approximately centrally therethrough; and

a series of foldable fins constructed of the same material as said propeller blades and consisting of a flat bottom surface rounded on one of its ends and blunt on the opposite end, semi-curved side surfaces, and a narrow top surface interconnecting on each end the opposed end surfaces with said top surface being tapered downwardly as it extends from the leading edge of a propeller blade to the trailing edge of a propeller blade, with each of said foldable fins further provided with a round through hole extending axially between said end surfaces and disposed near said rounded edge, and with each of said foldable fins being further provided with a rectangular groove disposed centrally along its bottom surface and provided with dimensions to fit over said flanges so that said round through hole in said foldable fins axially line up with said round through hole in said flanges with said foldable fins and

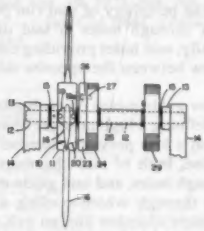
said flanges connected thereby in a pivotal manner by means of a pin.

4,047,836

PHASE CHANGE MEANS FOR A POWER DRIVEN DEVICE, SUCH AS A FAN

John A. Germer, Doylestown, Pa., assignor to The Budd Company, Troy, Mich.

Filed May 3, 1976, Ser. No. 682,943
Int. Cl.[2] F04D *29/36*
U.S. Cl. 416—39 **3 Claims**



1. A fan for moving air to provide variable cooling comprising,

a fan hub and a pitch control hub disposed to be rotated about the same axis and at the same speed,

a plurality of fan blades mounted to said fan hub to permit pivotal movement of said fan blades to vary the pitch thereof,

at least one linkage connected between one of said fan blades and said pitch control hub,

a first pulley belt mounted on a first pair of pulley wheels,

a drive shaft connected to a first one of said first pair of pulley wheels to drive said fan hub,

a second pulley belt mounted on a second pair of pulley wheels,

said second pulley belt including slack portions normally held under tension,

said pitch control hub being attached to a first one of said second pair of pulley wheels to drive said pitch control hub,

means for driving said first and second pulley belts through second ones of said pulley wheels,

a sleeve member slideably mounted on said drive shaft for fixedly holding said first one of said second pair of pulley wheels and said pitch control hub to permit varying the phase relationship between said pitch control hub and said fan hub,

transducer means responsive to temperature changes connected to move the slack portions of said second pulley belt to cause said sleeve member with said first one of said pulley wheels and said pitch control hub to be moved,

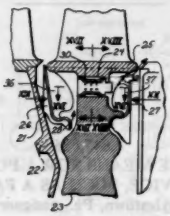
whereby a change in the angular positions of said at least one linkage changes the pitch of said plurality of fan blades.

4,047,837

TURBINE WHEEL HAVING INTERNALLY COOLED RIM AND RATED BREAKING POINTS

Alfred Hueber, and Roland Buchs, both of Munich, Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Munich, Germany

Filed Nov. 14, 1974, Ser. No. 523,787
Claims priority, application Germany, Nov. 16, 1973, 2357326
Int. Cl.[2] F01D 5/18; F02D 5/08
U.S. Cl. 416—95 5 Claims



1. A turbine wheel comprising:

a disc including a central portion and a rim portion around the periphery of said central portion, and blades spaced apart around the periphery of said rim portion,

b. a plurality of through holes in said disc spaced apart circumferentially, said holes providing communication for cooling air flow between the opposite sides of the turbine wheel,

c. cooling air flow guide means on each side of the disc, said guide means defining a high pressure chamber on one side of said disc and a low pressure chamber on the opposite side of said disc, both of said chambers communicating with said through holes, and said guide means defining an entry passage through which cooling air can flow into said high pressure chamber and an exit passage through which cooling air can flow out of said low pressure chamber, said entry passage being located radially inwardly of said exit passage, and

d. a generally tubular baffle in each of said through-holes, said baffle being spaced from the wall of said through-hole along at least a portion of the length of the baffle, said baffle being open at its end facing said high pressure chamber to receive cooling air therefrom, means for preventing flow of air to the other end of the baffle, and a plurality of holes in the wall of the baffle for directing cooling air radially against the wall of the through-hole, said baffles being flared at their opposite ends to maintain a spacing between the remainder of each baffle and its respective through hole wall, and said means for preventing flow of air being a bent tab arranged at the closed end of each baffle, said tab preventing axial movement of said baffle within its respective through hole,

e. in combination with a stator at one side of the turbine wheel, said stator having a series of passageways through which cooling air flows toward the through holes in the turbine wheel.

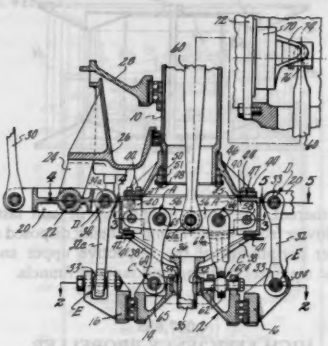
4,047,838

BLADE PITCH CONTROL MECHANISM FOR HELICOPTERS

Donald L. Ferris, and Robert L. Faiz, both of Newtown, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 22, 1976, Ser. No. 669,411
Int. Cl.[2] B64C 27/10
U.S. Cl. 416—115 9 Claims

1. In a helicopter, an upstanding rotor having a drive shaft, a rotor hub mounted at the upper end of said shaft, an axial passage extended through said shaft and into said hub, a variable pitch blade rotatable by said shaft having a spindle extended into said passage, a pitch control horn mounted on the end of said spindle within said passage, and means for controlling the pitch of said blade including a swashplate having rotatable and non-rotatable elements, a member rotatable by said drive shaft adjacent the lower end of the latter, a first pitch



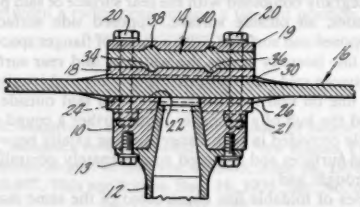
control link having a torque transmitting bearing in said rotatable member, a second link extended through said passage connecting said first link to said blade horn, and a third link having means connecting it to said first link and to said rotatable swashplate element for transmitting the rotary movement of said first link to said rotatable element.

4,047,839

TORQUE REACTING MEANS FOR THE HUBS OF CROSS BEAM ROTORS

Donald Leroy Ferris, Newtown, and William Lawrence Noehren, Huntington, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 28, 1976, Ser. No. 691,251
Int. Cl.[2] B64C 27/48, 27/38
U.S. Cl. 416—134 A 11 Claims



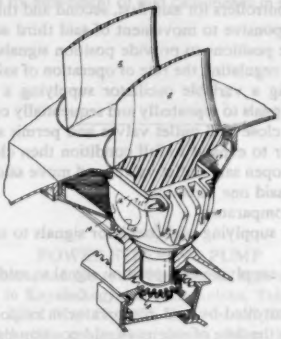
1. A cross beam rotor for helicopters comprising a rotor hub lower element, a composite lower blade spar, a composite upper blade spar, a blade-to-blade filler piece, and a rotor hub upper element, said upper and lower blade spars, said filler piece and said rotor hub upper and lower elements having aligned passages therein, tension fasteners extended through said passages, said passages in said blade spar and said filler piece having a diameter greater than the diameter of said fasteners, and means on the confronting faces of said rotor hub elements, said filler piece and said spars for reacting hub to spar torque.

4,047,840

IMPACT ABSORBING BLADE MOUNTS FOR VARIABLE PITCH BLADES

Richard Ravenhall; Charles T. Salemme, and Arthur P. Adamson, all of Cincinnati, Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 29, 1975, Ser. No. 581,751
Int. Cl.[2] F04D *29/36*; F01D *5/32*
U.S. Cl. 416—135 21 Claims



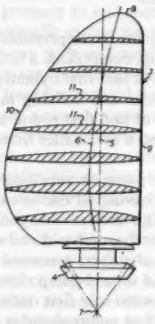
1. A blade mount for a variable pitch blade including a blade root, said blade mount comprising:
   a. a jaw having opposing sides defining a cross-sectional shape corresponding to that of the blade root, said jaw being open on at least one end for slideably receiving said blade root, and providing for the pivoting of the blade about an axis for absorbing impact energy, and
   b. a tie bar interconnecting said jaw opposing sides to resist the expansion of said jaw during centrifugal loading.

4,047,841

PROPELLER BLADING FOR A SELF-ADJUSTING PROPELLER FOR BOATS

Arvid Laurin, Skaldinge, Sweden, assignor to AB Jarnforadling, Hallefors nas, Sweden

Filed Nov. 4, 1975, Ser. No. 628,734
Claims priority, application Sweden, Nov. 15, 1974, 7414374
Int. Cl.[2] B63H *1/26*
U.S. Cl. 416—140 5 Claims



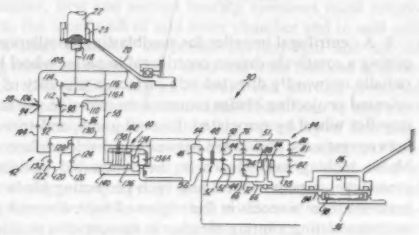
1. A self-adjusting sailing ship propeller system comprising:
   a drive shaft rotatable in opposite directions;
   a propeller body mounted on said drive shaft and rotatable therewith;
   a plurality of propeller blades rotatably mounted on said propeller body;
   each said propeller blade being freely rotatable about an axis of rotation to a neutral position when said drive shaft is stationary, and to respective forward or reverse pitch drive positions when said drive shaft is rotated in the forward or reverse directions, respectively;
   means within said propeller body to limit said forward or reverse pitch drive positions of said propeller blades;
   each said propeller blade having a configuration such that a center line of pressure thereof, formed by connecting points of greatest blade thickness taken in cross-sectional planes perpendicular to said axis of rotation, forms an arc which intersects said axis of rotation at a distance from the tip of said blade such that an outer portion of said propeller blade forms means for providing a moment acting on said propeller blade, upon the driving of said drive shaft, which is approximately equal to and which counteracts a directed moment causing said propeller blade to assume said neutral position when said drive shaft is stationary.

4,047,842

VARIABLE PITCH MECHANISM FOR FAN BLADES

Salvatore Avena, Newark, and Joseph W. Minarick, Oakland, both of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Apr. 19, 1976, Ser. No. 678,156
Int. Cl.[2] B64C *11/32*
U.S. Cl. 416—152 3 Claims



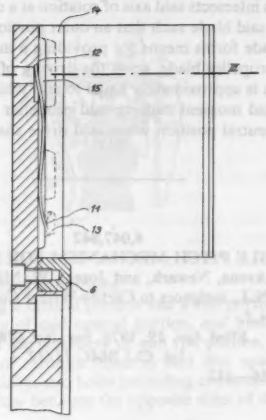
1. A pitch varying mechanism for a variable pitch fan in which a plurality of fan blades are supported in a rotor for rotative movement about their longitudinal axes and in which a drive shaft is provided for rotatively driving the rotor so that the fan blades are carried in a rotative path, the mechanism comprises, in combination:
   a. gear train means for providing output rotation in two directions;
   b. bi-directional clutch means rotatively connected to the drive shaft, a fixed structure and the gear train to provide the latter with rotational output alternately in one direction and the other;
   c. energizing means for selectively actuating the bi-directional clutch means to effect output rotation of the gear train means in a predetermined direction;
   d. a cageless planetary gear train comprising a plurality of ring gears meshing with a plurality of planets arranged concentrically of the drive shaft axis and radially outwardly of the bi-directional clutch means and the gear train means and connected to each of the fan blades to rotate the latter and change their pitch; and
   e. a bi-directional, no-back, clutch-brake connected to the gear train to transmit output rotation of the gear train means to the cageless planetary gear train to effect pitch-change of the fan blades and prevent transmission of the torque load on the fan blades to the gear train means during steady state operation when no blade pitch-change is being effected.

4,047,843

CENTRIFUGAL IMPELLER FOR SANDBLASTING INSTALLATIONS

Johannes Zeidler, Reinbek, and Bernd Von Borcke, Bad Oldesloe, both of Germany, assignors to Alfred Gutmann Gesellschaft fur Maschinenbau, Hamburg, Germany

Filed June 11, 1976, Ser. No. 695,063
Claims priority, application Germany, Feb. 16, 1976, 2606063
Int. Cl.[2] F04D 29/24
U.S. Cl. 416—185 4 Claims



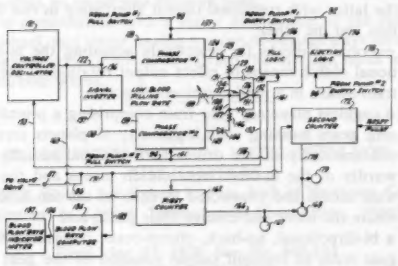
1. A centrifugal impeller for sandblasting installations, comprising a rotatively driven centrifugal impeller wheel having a radially outwardly directed side surface, a plurality of radially oriented projecting blades mounted on said side surface of the impeller wheel by associated dovetail joints, and spring members operatively positioned between said side surface and said blades locking said blades in their mounted positions, said centrifugal impeller wheel and each projecting blade defining between them a recess in the region of each dovetail joint for accommodating a spring member in its operative position, each spring member being enclosed entirely in its recess between its associated projecting blade and the impeller wheel.

4,047,844

BLOOD PUMPING SYSTEM

Thomas C. Robinson, Berkeley, Calif., assignor to Searle Cardio-Pulmonary Systems Inc., Emeryville, Calif.

Filed Dec. 8, 1975, Ser. No. 638,615
Int. Cl.[2] F04B 41/06
U.S. Cl. 417—3 6 Claims



1. A blood pumping system comprising a pair of pumps each having a pumping chamber defined by a flexible enclosure expandable to a full condition and compressible to an empty condition;

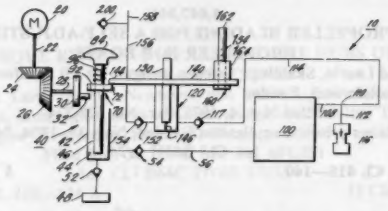
means defining blood inlets to both said chambers;
means defining blood outlets from both said chambers;
inlet valves for controlling flow through said inlets;
outlet valves for controlling flow through said outlets;
first actuators for said inlet valves;
second actuators for said outlet valves;
third actuators movable in one direction for compressing said enclosures to said empty condition and movable in the reverse direction to permit said enclosures to expand to full condition;
electric controllers for said first, second and third actuators;
means responsive to movement of said third actuator to its extreme positions to provide position signals;
means for regulating the rate of operation of said controllers including a variable oscillator supplying a sequence of timed signals to repeatedly and sequentially open said inlet valves, close said outlet valves and permit said pumping chamber to expand to full condition then close said inlet valves, open said outlet valves and move said third actuators in said one direction;
a signal comparator;
means for supplying said oscillator signals to said comparator;
means for supplying said position signal to said comparator; and
means controlled by said comparator in response to differences in the time of receipt of said position signals and said oscillator signals for varying the frequency of said oscillator.

4,047,845

CYCLIC PUMP

Paul H. Reeve, River Vale, N.J., assignor to Auto Research Corporation, Rochelle Park, N.J.

Filed Dec. 22, 1975, Ser. No. 643,376
Int. Cl.[2] F04B 3/00, 5/00
U.S. Cl. 417—251 19 Claims



1. A cyclic pump for incompressible fluids, comprising:
a first piston pump, comprising: a first cylinder, a first piston having an end in said first cylinder and movable through said first cylinder and defining in said first cylinder beyond said end of said first piston a first pump chamber; a first inlet to and a first outlet from said first pump chamber;
a second piston pump, comprising: a second cylinder, a second piston having an end in said second cylinder and movable through said second cylinder and defining in said second cylinder beyond said end of said second piston a second pump chamber; a second inlet to and a second outlet from said second pump chamber; a conduit directly connected between said first outlet and said second inlet, whereby said first pump chamber pumps to and fills said second pump chamber under pressure;
cam means for operating said first and said second piston pumps;
first cam follower means on said first piston pump and positioned to be moved by movement of said cam means; said first cam follower means being so positioned on and so connected with said first piston pump as to cause a predetermined change in volume of said first pump chamber

when said first cam follower means is moved by said cam means in one direction;

second cam follower means on said second piston pump and positioned to be moved by movement of said cam means in said one direction; said second cam follower means being so positioned on and so connected with said second piston pump as to cause a change in volume of said second pump chamber of the type opposite to said predetermined change in volume, which said second cam follower is moved by movement of said cam means in said one direction.

4,047,846

POWER-STEERING PUMP

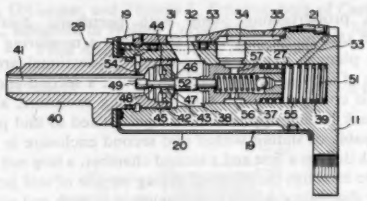
Seiji Komamura, and Hiroyuki Hashizume, both of Gifu, Japan, assignors to Kayabakogyokabushikikaisha, Tokyo, Japan

Filed May 18, 1976, Ser. No. 687,556

Claims priority, application Japan, May 19, 1975, 50-66972[U]

Int. Cl.[2] F04B *49/08*

U.S. Cl. 417—300 **8 Claims**



1. A power steering system adapted to be driven by an engine of a motor vehicle, comprising

a reservoir for hydraulic fluid;

a power steering mechanism;

a pump communicating with said reservoir for supplying hydraulic fluid under pressure to said mechanism;

means forming a hydraulic circuit having a supply branch which connects said pump with said mechanism;

a flow-control valve interposed in said supply branch for controlling the rate of fluid flow to said mechanism, said valve having a fluid outlet port, a chamber upstream of said port and provided with an inlet and with an outlet which communicates with said port, an annular member mounted intermediate said outlet and said port and having an axial bore communicating with said chamber and said port and an axial end face facing away from said chamber and formed with an orifice groove provided with an inner end which communicates with said bore and also with an outer end open to said port, and a valve member slidable in said chamber and having a rod-shaped extension projecting with clearance through said bore and provided adjacent said axial end face with an enlarged-diameter portion dimensioned to substantially block said bore so that, when said valve member slides in a direction in which said portion approaches said axial end face, said portion and said orifice groove together form a variablearea orifice the area of which becomes increasingly smaller as said portion approaches said axial end face whereby the flow of fluid out of said clearance and through said orifice is concomitantly progressively throttled.

4,047,847

MAGNETICALLY DRIVEN CENTRIFUGAL PUMP

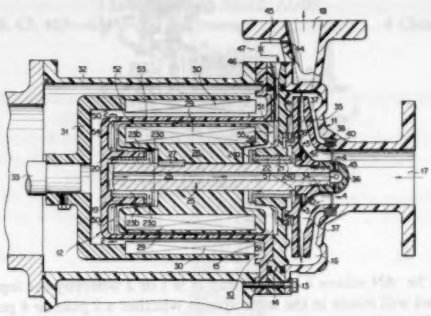
Kunihiro Oikawa, Hatoyama, Japan, assignor to Iwaki Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 669,827

Claims priority, application Japan, Mar. 26, 1975, 50-36324

Int. Cl.[2] F04B *35/04, 39/02*

U.S. Cl. 417—370 **15 Claims**



1. A magnetically driven centrifugal pump comprising a housing having a space provided therein, a split plate for dividing said space of said housing into a rotor chamber and an impeller chamber, an inlet and outlet connected to said impeller chamber, first and second bearing members fixed respectively to the inner wall of said rotor chamber and to said split plate, a shaft rotatably supported by said first and second bearing members respectively at its rearward end and intermediate portions and having its forward end portion projected into said impeller chamber, an internal rotor fixed to said shaft within said rotor chamber and having a plurality of first magnets, an external rotor disposed outside said housing and having a plurality of second magnets magnetically connected to said first magnets, a driving means for rotating said external rotor, an impeller fixed to said shaft within said impeller chamber, fluid intake passage means for guiding into said rotor chamber a fluid pumped by said impeller, resticting means for reducing the pressure of the fluid passing through said passage means, and cooling passage means for permitting the fluid sent from said rotor chamber to pass through said first and second bearing members thereby cooling said bearing members, the inner wall of said rotor chamber which is faced to the rearward face of said internal rotor being provided with first guide vanes extending toward said shaft, said first guide vanes defining first guide passages therebetween, said first guide passages being opened to the rotor chamber at their lengthwise sides and having such a configuration as to cause fluid rotating jointly with the internal rotor to positively flow through said first guide passages toward the shaft.

4,047,848

CENTRIFUGAL COMPRESSORS

Eric John Poole, Wendover, England, assignor to Compair Industrial Limited, England

Filed Jan. 21, 1975, Ser. No. 542,814

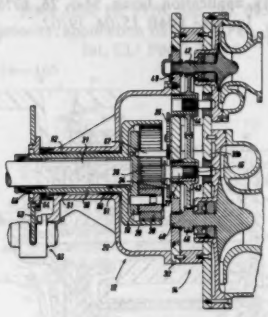
Claims priority, application United Kingdom, Jan. 31, 1974, 4604/74

Int. Cl.[2] F04B *35/04*

U.S. Cl. 417—374 **4 Claims**

1. In combination with an electrical motor means operating as a 2 pole or 4 pole in the range of 50 Hz to 60 Hz for driving a two-stage centrifugal compressor with said stages having parallel impeller shafts and a centrifugal impeller mounted on each shaft; a gear train for driving the impeller shafts which gear train includes gears mounted on each of the impeller shafts parallel to each other and intermeshing rotatably dis-

posed input gears in mesh with the gears on the impeller shafts, either of said input gears being adapted to receive drive from said motor means, the ratio of the number of teeth of the input gears being such that the relative shaft speeds of the input gears



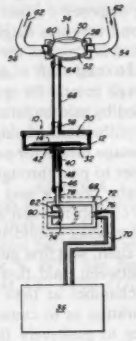
are $5n : 6N$ where n is 1 or 2 and N is 1 or 2 whereby the input gears will rotate at the same speeds whether a 2 pole or 4 pole 50 Hz or 2 pole or 4 pole 60 Hz motor means is being used so that the rotational speeds of the impeller shafts will be the same.

4,047,849

PNEUMATIC PULSATOR PUMPING SYSTEM WITH PULSATOR FLUID VENTING VALVE

Warren C. Clay, Lynn, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed Jan. 9, 1976, Ser. No. 647,680
Int. Cl.² F04B *9/08, 35/02*
U.S. Cl. 417—384 **2 Claims**



1. A blood circulatory assist device comprising:

flexible bladder enclosed in a rigid housing and defining inlet means and outlet means for intermittently admitting and releasing blood to and from bladder;

means forming a pneumatic system, including as a part thereof the space between said bladder and said housing;

pneumatic pulse generator means for rhythmically pressurizing and pressure relieving said pneumatic system to rhythmically compress and release said flexible bladder;

means dividing said pneumatic system interposed between said pneumatic generator and said circulatory assist device for transmitting pneumatic forces from one division of said pneumatic system to the other; and

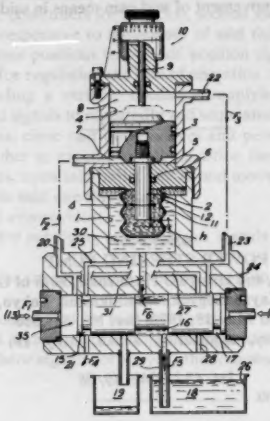
release valve means in said pneumatic system for venting said pneumatic system between said dividing means and said pneumatic generator in response to pressure relief by said pneumatic generator.

4,047,850

PROPORTIONING PUMP WITH PNEUMATIC DISTRIBUTOR

Guy Berthelot, Ivry, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed May 21, 1973, Ser. No. 362,514
Claims priority, application France, June 2, 1972, 72.19984
Int. Cl.² F04B *9/08, 35/02*
U.S. Cl. 417—383 **2 Claims**



1. A proportioning pump with pneumatic distributor, wherein said pump essentially comprises a measuring enclosure, a plunger having a constant cross-sectional area and capable of moving within said enclosure, a second enclosure which is contiguous with said measuring enclosure, a pneumatic jack having opposite faces rigidly fixed to said plunger and capable of sliding within said second enclosure in which said jack defines a first and a second chamber, a stop rod which serves to establish the range of sliding motion of said jack, and a linear distributor which communicates at each end with one of two sources of driving fluid, said distributor being provided with three grooves and being moveable from one end position to another end position which, in one end position of the distributor, said grooves put said measuring enclosure into communication with a storage tank for the withdrawal of liquid to be supplied in measured quantities and put one of said faces of said jack which is directed towards said measuring enclosure into communication with one of said sources of driving fluid and which, in the other end position of the distributor, said grooves put said measuring enclosure into communication with a collecting tank for receiving measured quantities of liquid and put the other face of said jack into communication with the other of said sources of driving fluid.

4,047,851

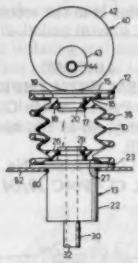
BELLOWS TYPE EXPANSIBLE CHAMBER PUMP HAVING SEPARATE BIASING MEANS

Lloyd F. Bender, Hayward, Wis., assignor to Bender Machine Works, Inc., Hayward, Wis.

Filed Sept. 27, 1976, Ser. No. 726,834
Int. Cl.² F04B *43/00;* **A61M** *1/03*
U.S. Cl. 417—412 **6 Claims**

1. A bellows type expansible chamber pump comprising a resilient, corrugated bellows having opposite ends and having a generally flat seating surface at each of its opposite ends and also having an annular engaging member adjacent each of its ends, a first pump end section having a generally flat surface adapted to abut firmly against one of said flat surfaces of said bellows ends, said first pump end section also having a radially extending flange extending radially beyond said bellows, said first pump end section also having an annular engaging mem-

ber forming a quickly releasable tight snap fit with one of said annular engaging members of said bellows, a second pump end section having a radially extending flange which extends radially beyond said bellows and also having a generally flat surface which is adapted to abut firmly against the other flat



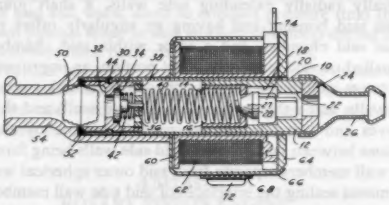
surface of said bellows, said second end section also having annular engaging means which forms a quickly releasable snap fit with said other annular engaging means of said bellows, a coil spring surrounding said bellows and abutting against and between said radially extending flanges of said end sections urging them apart in a pump extended direction.

4,047,852

IN-LINE PUMP CONSTRUCTION

Alton J. O'Connor, and Thomas L. Schrinel, both of Cass City, Mich., assignors to Walbro Corporation, Cass City, Mich.

Filed Aug. 16, 1976, Ser. No. 714,388
Int. Cl.² F04B *17/04*
U.S. Cl. 417—415 **6 Claims**



1. A fuel pump adapted for mounting in a fuel line which comprises:

a. a tube forming a body,

b. a solenoid coil assembly mounted concentrically around one end of said body,

c. a tubular armature slidable in said body in the area surrounded by said coil, said armature having a stepped bore, one end of said stepped bore serving as a guide for a flow check valve, the other end of said bore serving as a valve seat retainer,

d. a cup-shaped valve seat having a valve opening in the bottom thereof and positioned in said other end of said stepped bore,

e. a slidable flow check valve member guide in said bore having a valve portion to cooperate with said valve opening in said valve seat,

f. a second valve housing at the other of said body having a valve seat and valve recess,

g. a valve in said valve recess to cooperate with said seat,

h. spring means interposed between said cup-shaped valve seat and said second valve housing to serve as a retainer for said cup-shaped valve seat and a resilient bias for said armature, and

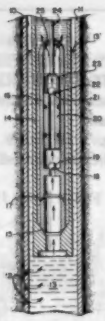
i. means to retain said second valve housing in said body against said spring means.

4,047,853

HYDRAULIC UNLOADING AND CIRCULATING DEVICE

Leonard Huckaby, P.O. Box 152, Wayne, Okla. 73095

Filed Nov. 15, 1976, Ser. No. 741,944
Int. Cl.² F04B *39/12, 21/00*
U.S. Cl. 417—434 **4 Claims**



1. A hydraulic unloading and circulating device adapted to be inserted in a threaded joint of a well tool connected to sucker rods and including a pumping tube surrounding said tool and supported on the end of a pipe string through which said sucker rods extend, for passing fluid between the exterior of the tool and interior of the pumping tube to the interior of the tool so as to be placed in communication with the well annulus and thereby relieve the difference of hydrostatic pressure between fluid in the well annulus and fluid in the interior of the pumping tube and pipe string, said device comprising, in combination:

a. a housing having lower threads for threaded connection to the lower threads of said joint;

b. a mandrel having a lower end portion telescopically received in the upper portion of said housing, the upper end of said mandrel being coupled to the upper threads of said joint, said mandrel having a straight through central passage including a lateral port eclipsed by said housing when said mandrel is telescoped within said housing to a first given position, and exposed above said housing when said mandrel is pulled upwardly from said housing to a second telescoped position;

c. a sleeve in the lower portion of said housing having cut-out wall portions defining vertical guide channels of given circumferential width, the lower end of said mandrel being received in said sleeve and having radially extending lugs of given circumferential extent receivable in said channels so that upward and downward telescoping movement of said mandrel between said first and second telescoped positions is guided by said guide channels, the lower ends of said sleeve between said channels being spaced above the lower end of said mandrel when in said first telescoped position so that rotation of said mandrel through a given number of degrees positions said lugs beneath said lower ends of the sleeve to thereby lock the mandrel against pulling movement when in its rotated position; and

d. a torque spring connected between said mandrel and said housing to exert a circumferentially directed biasing force on said mandrel in a rotational direction to position said lugs beneath said lower ends of the sleeve,

whereby intentional rotation of the sucker rods from the surface of the well through said given number of degrees in a rotational direction opposite to the bias of said torque spring

positions through the upper threaded coupling of the mandrel said lugs in said channels, and subsequent upward pulling on said sucker rods from the surface of said well move said mandrel to said second telescoped position thereby exposing said port and placing fluid in said pump tube and pipe string in communication with fluid in the annulus of the well to thereby equalize the hydrostatic pressure of the fluid, subsequent urging of said mandrel to its first telescoped position eclipsing said port and permitting rotation of the mandrel by said spring to its rotated position to lock the mandrel against telescoping movement relative to said housing.

4,047,854

METERING PISTON PUMP WITH PISTON-CARRIED DISTRIBUTOR FOR VISCOUS FLUID

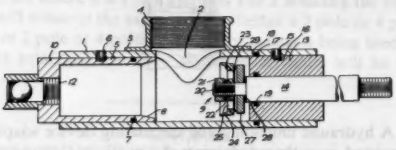
Laurence Richard Penn, 18 Church Mount, Guilsborough, Northampton, England

Filed Aug. 7, 1975, Ser. No. 602,547

Claims priority, application United Kingdom, May 27, 1975, 23106/75

Int. Cl.² F04B *7/04, 39/10, 15/02*

U.S. Cl. 417—489 **1 Claim**



1. A material dispensing and metering piston pump comprising, in combination:

1. a cylinder having an axis and defining a chamber receiving the material to be dispensed and metered, the cylinder defining
   a. an inlet for the material,
   b. an outlet for the material axially spaced from the inlet, and
   c. a coaxial cylindrical metering portion extending in the cylinder chamber from the outlet towards the inlet,
2. a non-return valve in the outlet, and
3. a piston mounted for axial reciprocation in the cylinder chamber between a first terminal position in the metering portion adjacent the outlet and a second terminal position adjacent the inlet, the piston comprising
   a. a piston rod and
   b. a piston head mounted on the piston rod, the piston head including a first member having a peripheral skirt projecting in an axial direction towards the outlet and having a diameter corresponding to that of the metering portion for sealing engagement between the peripheral skirt and the metering portion, the first piston head member defining at least one axially extending aperture therethrough and being mounted for free axial movement on the piston rod between a first axial position and a second axial position, and a second member having a diameter smaller than that of the metering portion and being fixedly mounted on the piston rod adjacent the second axial position, the sealing engagement between the peripheral skirt and the metering portion holding the first piston head member in the first axial position spaced from the second piston head member upon axial movement of the piston away from the outlet and out of the metering portion, whereby the material in the chamber may flow between the piston head members and through the aperture, means on the piston rod for supporting the first piston head member on the piston rod during the axial movement of the piston away from the outlet, and axial movement of the piston towards the outlet and the metering portion causing the peripheral skirt to engage the metering portion and thus to move the first piston head member axially into the second position whereby the second piston head member seals the aperture and prevents flow of the material therethrough into the metering portion, one of the piston head members having a circular ridge defining a knife edge and the other piston head member having a corresponding circular recess for sealing engagement between the knife edge ridge and recess when the first piston head member is in the second axial position.

4,047,855

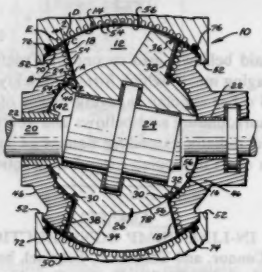
ROTARY MECHANISM WITH IMPROVED COOLING

Alexander Goloff, East Peoria; Noble G. Barker, Pekin, and Paul J. Staebler, Dunlap, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 12, 1975, Ser. No. 640,084

Int. Cl.² F04C *29/04*

U.S. Cl. 418—53 **1 Claim**



1. In a slant axis rotary mechanism including a housing defining a chamber having a radially outer spherical wall and a radially inner spherical wall interconnected by opposed, generally radially extending side walls, a shaft journalled within said housing and having an angularly offset portion within said chamber, and a rotor within said chamber and journalled on said angularly offset portion, an improved cooling system including a plurality of coolant receiving grooves in said walls, and a thin cover plate for said walls and thus said grooves and being supported against collapse by the wall portions between said grooves; said side walls being formed by side wall members separate from said outer spherical wall, gas seal means sealing the interfaces of said side wall members and said outer spherical wall, there being at least one said groove between said gas seal means and said chamber along said interface.

4,047,856

ROTARY STEAM ENGINE

Ralph M. Hoffman, 15950 N. Hillcrest Court, Eden Prairie, Minn. 55343

Filed Mar. 18, 1976, Ser. No. 668,150

Int. Cl.² F01C *1/02, 21/12*

U.S. Cl. 418—61 A **11 Claims**

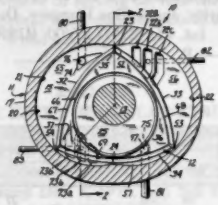
1. In a rotating machine including a housing having opposite end walls spaced apart along a first axis by a peripheral wall shaped to define an epitrochoidal cavity symmetrical about said first axis and configured as two lobes intersecting at lobe junctures which define a minor axis of the section of said housing normal to said first axis, one of said lobes lying in first and second quadrants about said first axis and the other lying in third and fourth quadrants thereabout,

a rotor symmetrical about a further axis and movable in said cavity, said rotor having opposite side wall surfaces adjacent, and in slightly spaced relation, to said end walls of said housing, and interconnected by a plurality of peripheral flank surfaces which intersect at apices to determine

lines of sealing contact with said peripheral wall of said housing,

means, including a crankshaft on which said rotor rotates on said further axis eccentrically with respect to said first axis, for limiting motion of said rotor in said cavity to planetating movement about said first axis in the direction from said fourth quadrant to said first quadrant, so that said apices sweep through said lobes,

spaced seal means, including inward valving seal means and outward chamber isolating seal means, carried by at least one side wall surface of said rotor to move in the interstice between said side wall surface and the adjacent end wall of the housing, so that said rotor and said housing jointly define a plenum space inward of said valving seal means



and a plurality of distinct working chambers, outward of said isolating seal means, which move about said first axis and successively increase and decrease in volume with said movement of said rotor,

and means for conducting a fluid into said housing at a site inward of said valving seal means, the improvement which comprises:

bridging passage means in the inner surface of at least one of said end walls, sized to conduct pressure fluid from said plenum space to said working chambers during first predetermined portions of said movement;

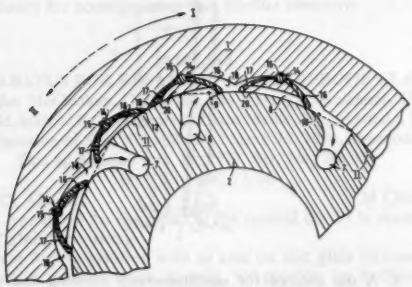
and further passage means in said inner surface of said one of said end walls for affording egress of pressure fluid from said working chambers during second predetermined portions of said movement.

4,047,857

ROTARY PISTON ENGINE

Arno Fischer, Pfistermuhle, 8121 Rottenbuch, Upper Bavaria, Germany

Filed Nov. 4, 1975, Ser. No. 628,632
Claims priority, application Germany, Nov. 4, 1974, 2452288
Int. Cl.[2] F04C *5/00, 1/00*
U.S. Cl. 418—153 **12 Claims**



1. A rotary piston engine including a stator and a rotor located concentrically thereto, and sealing elements positioned in the rotor and sealingly engaging a race of the stator, the stator including separating portions in contact with the rotor and having feed and discharge ports arranged between working chambers, said sealing elements comprising:

a stationary cylindrical bearing portion pressed into said rotor;

at least one curved blade connected to said bearing portion and extending forwardly in the direction of rotation of said engine to engage said stator race; and

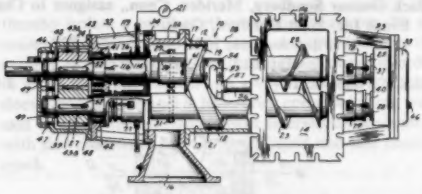
said curved blade adapted to pivot into a curved recess provided in said rotor to accommodate said blade.

4,047,858

STUFFING BOX FOR HIGH DENSITY SCREW PUMP AND PUMP INCORPORATING SAME

Albert A. Zalis, Warren, Mass., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Mar. 10, 1976, Ser. No. 665,387
Int. Cl.[2] F01C *1/16*
U.S. Cl. 418—201 **9 Claims**



1. Apparatus for rotary screw pumping comprising

A. a casing having defined therein parallel, overlapping bores, an intake chamber communicating with one end region of said bores, and a laterally opening output aperture at the opposite end region of said bores,

B. a pair of oppositely rotating rotors extending axially of said bores and extending across said intake chamber, said rotors having continuous helical intermeshing pumping flights within said bores and said intake chamber, said rotors further having shaft means projecting through said casing from respective opposite end portions of said rotors,

C. a plurality of bearing means, each one journaling a different one of said shaft means, said bearing means each being supported in outwardly spaced relationship to said casing by bearing support means,

D. a plurality of stuffing box assemblies, each said assembly embracing a different one of said shaft means, each assembly being located between said casing and an axially adjacent one of said bearing means relative to each shaft means, each said assembly being adapted to make sealing engagement with said casing and with said shaft, and

E. stuffing box floating mounting means mounting each said stuffing box assembly in axially fixed but radially limitedly movable relationship to said casing,

F. each stuffing box assembly comprising a housing having a cylindrical channel extending therethrough defined therein, and through which said shaft means extends, packing means in said channel between said channel and said shaft means, and gland means including adjustable pressurizing means for compressing said packing means between said channel and said shaft means,

G. an annular flange radially outwardly projecting from said housing in spaced relationship to one end of each of said channels and a demountable brace means associated therewith and radially outwardly projecting at each said one end, each said flange and said associated brace means defining in combination with said housing a circumferentially extending radially outwardly opening groove, and

H. a pair of O-ring sealing means, each including an O-ring and a groove receiving same, said sealing means being

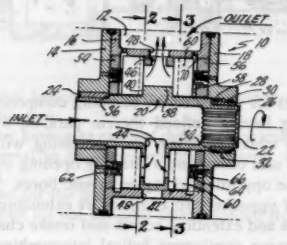
located on generally opposed sides of each of said channels, one of said sealing means being associated with each of said brace means, the other such sealing means being associated with each of said flanges.

4,047,859

AXIAL VANE PUMP WITH NON-ROTATING VANES

Jack Gunnar Sundberg, Meriden, Conn., assignor to Chandler Evans Inc, West Hartford, Conn.

Filed Aug. 16, 1976, Ser. No. 714,598
Int. Cl.² F04C *15/00, 1/00*
U.S. Cl. 418—232 **1 Claim**



1. A vane pump comprising:

a housing;

a cam member mounted in the housing for rotation about an axis, the cam member having an annular axial side which defines an undulated cam surface with at least one inlet arc and at least one discharge arc;

an array of vanes, each having a radially extending contact surface, fixedly mounted in the housing for axial movement parallel to the axis of rotation toward and away from the cam surface, the contact surfaces of the vanes being adapted to respectively engage the cam surface such that rotation of the cam member produces axial movement of the vanes toward and away from the cam member;

inlet passage means for directing fluid entering the pump into the volume defined between two adjacent vanes when one of the adjacent vanes is traversing an inlet arc;

discharge passage means for receiving fluid expelled from the volume between two adjacent vanes when one of the adjacent vanes is traversing a discharge arc;

a spring loaded piston mounted in the housing behind each vane to urge the vane into engagement with the cam surface, the side of the piston remote from the vane being subjected to inlet pressure and the side of the piston adjacent the vane being subjected to the pressure behind the vane; and

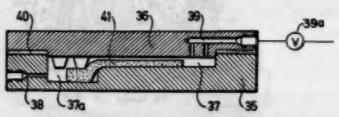
means to direct discharge pressure behind each vane, the spring loading on the pistons being such that a discharge pressure achieved at a low pump speed is sufficient to force the pistons away from the vanes, whereby constant flexing of the springs is not encountered during normal operation.

4,047,860

PRESS MOLD FOR PRODUCING MICROCELLULAR SHAPED PIECES OF DIMENSIONAL ACCURACY, PARTICULARLY SHOE SOLES

Boris Nisonovich Dinzburg; Jury Alexandrovich Smetkin; Vladimir Iosifovich Alexeenko; Vsevolod Andreevich Mikhailov, all of Moscow, U.S.S.R.; Ivan Lorant, Budapest, Hungary; Gyozo Seltenreich, Dunakeszi, Hungary; Jeno Keszei, Budapest, Hungary; Gyorgy Marton, Budapest, Hungary; Albert Balazsfai, Budapest, Hungary; Jeno Donath, Budapest, Hungary, and Erno Bolcskei, Budapest, Hungary, assignors to Bor-, Cipo-, Szormeipari Kutato Intezet, Budapest, Hungary and Vseojuzny Nauchno-Issledovatelsky Institut Plenochnykh Materialov I Iskusstvennoi Kozhi, Moscow, U.S.S.R.

Division of Ser. No. 332,089, Feb. 13, 1973, Pat. No. 3,897,190, which is a division of Ser. No. 96,738, Dec. 10, 1970, abandoned.
This application Feb. 26, 1975, Ser. No. 553,152
Claims priority, application Hungary, Dec. 30, 1969, BO 1210
Int. Cl.² B29D *27/00*; B29F *1/00*
U.S. Cl. 425—4 R **1 Claim**



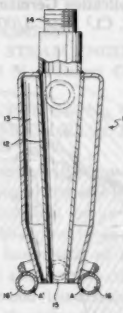
1. A press tool for vulcanizing plastic material, comprising a die, a cover plate forming with said die a molding chamber, said die having a flat bottom surface and said cover plate having a flat upper surface parallel to said bottom surface of said die, said die and cover plate having upright edges extending between said upper and lower surfaces, means for introducing a hot liquid through a said edge of said die into a lower portion of said chamber, and means to remove gas from an upper portion of the chamber through a said edge of said cover plate.

4,047,861

EXTRUSION DIE WITH FIBRILLATING AIR NOZZLE

Alexander Balaz, Barrington, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation of Ser. No. 478,758, June 12, 1974, abandoned.
This application Sept. 22, 1975, Ser. No. 615,310
Int. Cl.² A23P *1/00*; D01D *5/26*
U.S. Cl. 425—7 **4 Claims**



1. A die utilized for simultaneously forming and cooling fibers in a hot food extrudate comprising:

a. an outer heating means engaged about an inner housing and completely surrounding said inner housing;

b. said inner housing having an inlet in the upper portion of

said housing and an elongated outlet in the lower portion of said housing, said lower outlet having one opening;

c. a first gas injection means affixed to said outer heating means located adjacent one elongated sided of said outlet, said first gas injection means comprises an air pipe having a plurality of three or more orifices, said air pipe being connected to a pressurized air source to project air through said orifices upon the hot extrudate flowing through said outlet;

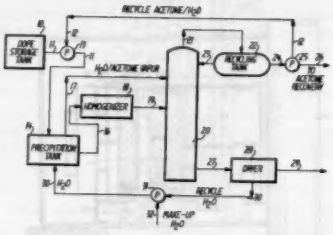
d. a second gas injection means affixed to said outer heating means located adjacent the other elongated side of said outlet and parallel to said first gas injection means, said second gas injection means comprising an air pipe having a plurality of three or more orifices, said air pipe being connected to a pressurized air source to project air through said orifices upon the hot extrudate flowing through said outlet, said first and said second gas injection means being capable of forcing air into the hot extrudate to fibrillate it before it substantially cools and maintain it in a fiber state while cooling.

4,047,862

CELLULOSE ESTER FIBRILLAR STRUCTURE

Charles Herbert Keith, Charlotte, N.C., assignor to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 409,197, Oct. 24, 1975, abandoned.
This application Dec. 8, 1975, Ser. No. 638,242
Int. Cl.[2] B29C *23/00*
U.S. Cl. 425—8 **5 Claims**



1. An apparatus for the production of an opaque, voidy fibrillar structure which comprises a precipitation tank containing a precipitation bath; a substantially cylindrical disk positioned within said tank and submerged in said bath; means for rotating said disk in said bath at a peripheral speed of at least 500 meters per minute; a stationary annular wall spaced from said disc's peripheral surface by 1/16 to ¼ inch; one or more orifices positioned about the periphery of said disk; means for pumping additional precipitation bath into said precipitation bath and past the periphery of said disk at a flow rate of at least 0.5 liter per minute per extrusion orifice; means for removing the precipitated fibrillar structure from said bath; and means for homogenizing said fibrillar structure.

4,047,863

APPARATUS FOR REPAIR OF SHATTERPROOF GLASS

Douglas McCluskey, Greenlane, and Harley E. Kelchner, Hatfield, both of Pa., assignors to Glass Medic, Inc., Hatfield, Pa.

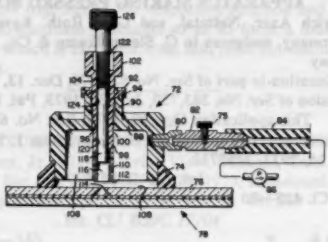
Continuation of Ser. No. 668,469, March 19, 1976, abandoned.
This application Jan. 18, 1977, Ser. No. 760,339
Int. Cl.[2] B29C *11/00*
U.S. Cl. 425—13 **26 Claims**

26. Apparatus for the repair of the conical cracks in shatterproof glass comprising:

means for cooperating with an area on said glass surrounding a conical crack therein, to provide an enclosure bounded in part by said area; and

means for evacuating said enclosure;

wherein said means to provide an enclosure comprises means forming a wall and means for causing said wall to be spaced from said area when said enclosure is bounded in part by said area, said wall having an opening with threads and said apparatus also including a sleeve threaded into said opening and movable toward and away from said area by the action of said threads, annular sealing means on one end of said sleeve adapted to contact the surface of a piece of shatterproof glass to be repaired and



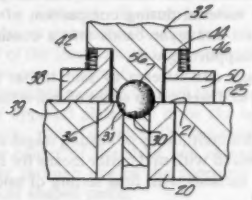
thereby isolate a small portion of said area from the remainder thereof, and control means manipulable from the exterior of said enclosure for rotating said sleeve in order to move the same toward and away from said area, said sleeve having a channel in its interior communicating with said one end thereof, and means operatively associated with said channel to force a repair liquid into said conical crack.

4,047,864

APPARATUS FOR PRODUCING SPHERICAL ARTICLES

Raymond P. DeSantis, Royal Oak, Mich., assignor to Wolverine Aluminum Corporation, Lincoln Park, Mich.

Filed Oct. 6, 1975, Ser. No. 619,855
Int. Cl.[2] B30B *11/02*
U.S. Cl. 425—78 **6 Claims**



1. An apparatus for compacting powder material into a spherical solid article, said apparatus comprising a punch and die assembly comprising a die plate, a bore in said die plate, a unitary single piece punch disposed reciprocably in said bore, a concave compacting face on an end of said punch, a progressively enlarged end portion in said bore, said enlarged end portion forming with said compacting face in said punch a first half-mold cavity, a unitary single piece counterpunch overlapping the end portion of said bore and having a flat annular end face engageable with a surface of said die plate surrounding said end portion of said bore and preventing said counterpunch from penetrating into said bore, a second concave half-mold cavity disposed in said counterpunch within said annular end face, said second half-mold cavity being alignable with said bore, supporting and guiding means for said counterpunch disposed above said die plate and having a face in sliding engagement with said die plate, means for reciprocating said punch to a position whereby the face of said punch forms with the enlarged end portion of said bore said first half-mold cavity for compacting said powder material in a molding cavity, means for displacing said punch to a position ejecting said

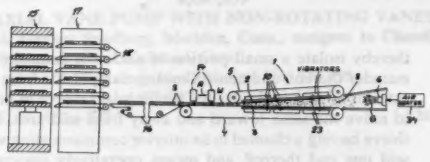
article from said bore upon retraction of said counterpunch a distance away from said die plate, and a slot in said supporting and guiding means for clearing said article when ejected from said bore.

4,047,865

APPARATUS MAKING PRESSED BOARD

Heinrich Axer, Nettetal, and Gerd Roth, Kevelaer, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany

Continuation-in-part of Ser. No. 532,375, Dec. 13, 1974, which is a division of Ser. No. 383,730, July 30, 1973, Pat. No. 3,904,336.
This application Oct. 20, 1975, Ser. No. 624,780
Claims priority, application Germany, Aug. 1, 1972, 2237755; Nov. 14, 1972, 2255712
Int. Cl.[2] B29J *5/04*
U.S. Cl. 425—80 **6 Claims**



1. In an apparatus for making pressed board from thermosetting resinous material and filter, in combination:

a a pair of perforated, endless conveyor bands with generally horizontal, relatively inclined confronting surfaces forming a converging throat between them;

nozzle means adjacent said conveyor bands for continuously blowing a substantially horizontal stream of thermosetting resinous material and filler entrained by a carrier fluid into said throat from the broad end thereof;

heating means at said throat for thermally presetting said resinous material during compaction of the mixture between said conveyor bands into a continuous, coherent and self-supporting web;

cutter means downstream of said throat for transversely dividing said web into a series of individually manipulable sections;

a press with a multiplicity of heating stages at different levels synchronized with said cutter means for further compacting said sections with final setting of said resinous material; and

transport means for delivering said sections from said cutter means to the several levels of said press in timed relationship with the operation thereof.

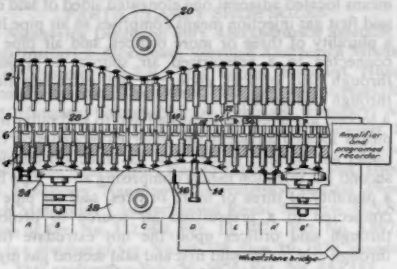
4,047,866

AUTOMATIC SELF-LUBRICATING ROTARY TABLET PRESS

Dhiren N. Shah, Indianapolis, Ind., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 22, 1976, Ser. No. 743,899
Int. Cl.[2] B30B *11/08*
U.S. Cl. 425—107 **4 Claims**

1. In a rotary tablet press having a revolving head with multiple upper punches, lower punches, and dies that ride on a cam path having stations for filling the dies with tabletting material, adjusting the amount of die fill, compressing the tabletting material to form a tablet, and ejecting the tablet, wherein the improvement comprises a force detector for measuring the force required to eject the tablet from a given die cavity, said force detector being connected to a lubricator for applying controlled amounts of lubricant to said die cavity and punch faces, said lubricator being activated as the force required to eject the tablet from the die cavity reaches a predetermined value as measured by the force detector.

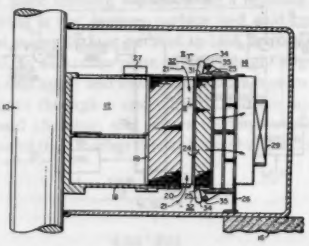


4,047,867

CASTING ASSEMBLY FOR STATOR COILS

Michael R. Zona, McKeesport; Charles R. Ruffing, Edgewood, and Paul S. Johrde, Franklin, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 4, 1976, Ser. No. 683,117
Int. Cl.[2] B29C *1/04, 5/00*
U.S. Cl. 425—117 **3 Claims**



1. In a core member of a dynamoelectric machine having a winding supported by said core, said winding including a plurality of coil end turn terminal portions which project from said core, a selected plurality of said coil end turn terminal portions being disposed in side-by-side relation with respect to one another for connection in electrical series relation one to another by electrical connecting means, the combination with said winding of a casting assembly for encapsulating said end turn terminal portions and electrical connecting means, said casting assembly comprising:

a removable pad of conformable material secured to said selected end turn terminal portions, said pad having radially extending side portions which circumscribe and extend transversely to said selected coil terminal portions to provide a barrier to the axial flow of a fluid relative to said selected terminal portions;

a sleeve disposed around said selected end turn terminal portions in a spaced relation therewith and in an abutting relation with said pad, said sleeve having a continuous, circumferentially extending side portion bounded by first and second open end portions, said sleeve providing a barrier to the radial flow of a fluid relative to said end turn terminal portion, said first open end portion of said sleeve being disposed in abutting engagement with said pad, and said side portion being radially spaced from said end turn terminal portions;

means compressing said removable pad against said end turn terminal portions to substantially fill a void which may

exist between said coil end turn terminal portion and said pad;

means forcing said sleeve against said pad to establish a compressive union at the interface of said first open end portion of said sleeve and said conformable pad; and,

a compound disposed in the volume defined by the union of said sleeve and said pad, said compound when cured providing electrical insulation and thermal conduction for said end turn terminal portions and said electrical connecting means.

4,047,868

MULTILAYER PARISON EXTRUSION MOLDING MACHINE FOR BLOW MOLDING

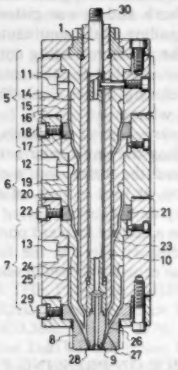
Kazuo Kudo, and Takashi Mizutani, both of Tokyo, Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 610,169, Sept. 4, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 775,735

Claims priority, application Japan, Aug. 12, 1975, 50-97841

Int. Cl.[2] B29D *23/04*

U.S. Cl. 425—133.1 **3 Claims**



1. A multilayer parison extrusion molding machine for blow molding wherein one main extruder and one or more subextruders are mounted radially around one diehead at an angle of 25° to 90° relative to each other, said diehead comprises a core holder having a core pin at the lowermost end thereof, a cylindrical mandrel enclosing said core holder therein, a die portion including an extrusion die and adjusting means for adjusting the relative positions of said core pin and said extrusion die, said die portion constructed to surround said core holder so as to form a resin extrusion outlet opening, and at least two head portions provided on said die portion, each of said head portions form a resin layer and wherein each of said portions comprises:

a. a sleeve surrounding said mandrel, the external surface of said sleeve being arranged to allow change of the flowing direction of resin and the internal surface thereof being arranged to surround the mandrel;

b. a housing which surrounds said sleeve with a space therebetween to define a resin passage for forming a resin layer, and includes an internal surface parallel to the external surface of said sleeve, and a resin inlet opening connected to said resin passage and to one of said extruders;

c. a pressure ring mounted on said housing downstream from said resin inlet opening for controlling the thickness and pressure of the molten resin layer formed by said resin passage, at least one surface of said pressure ring being arranged parallel to the external surface of said sleeve and shaped to change the flow direction of the resin layer, another surface of said pressure ring being arranged parallel to the external surface of said mandrel and spaced from the external surface of said sleeve, the pressure ring surface directions in cooperation with the internal surface of the housing being adapted to change the resin flowing direction two times; and

d. means operatively associated with said pressure ring for adjusting said pressure ring to vary the size of said resin passage; and

e. the resin passages of adjacent ones of said head portions arranged to merge at a respective junction so that the individual resin layers formed in each of said head portions flow together at the respective junction and subsequent downstream junctions so as to form a multilayer parison which is extruded from said resin extrusion outlet opening.

4,047,869

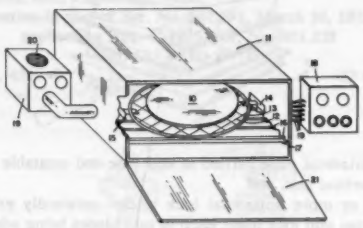
APPARATUS FOR FORMING PLASTIC ARTICLES

R. F. Mulvany, Jr., 521-C Marine View, Belmont, Calif. 94002

Division of Ser. No. 335,401, Feb. 23, 1973, abandoned. This application Apr. 29, 1976, Ser. No. 681,659

Int. Cl.[2] B29C *17/04*

U.S. Cl. 425—143 **5 Claims**



1. A device for forming plastic articles comprising:

a pair of opposed platens adapted to compress a heated sheet of thermoplastic material therebetween, said pair of opposed platens having corresponding apertures through the centers thereof to expose the center of said heated sheet of thermoplastic material, the compression between said opposed platens generally allowing for controlled planar movement of the thermoplastic material radially inwardly towards the center thereof;

an extension member passable through the apertures through the pair of opposed platens to draw the heated sheet of thermoplastic material inwardly between the platens toward the center of the sheet and extend the material transversely through one of the apertures into an elongated conical shaped piece;

means for monitoring the movement of the thermoplastic material radially inwardly toward the center of said sheet;

means for controlling the compression of the heated sheet of thermoplastic material by the pair of opposed platens responsive to said monitoring means to control slippage of said sheet of thermoplastic material relative to said pair of opposed platens;

an involute female mold adapted to receive the elongated conical shaped piece of thermoplastic material therein; and

means for pressurizing the interior of the elongated conical shaped piece of thermoplastic material to expand and press the thermoplastic material against the interior surface of the involute female mold.

4,047,870

AUTOMATIC PODIATRIC CONTROL MOLDER

Fulvio Smaldone, 313 E. North Ave., Northlake, Ill. 60164

Filed June 1, 1976, Ser. No. 691,510

Int. Cl.[2] B29C *3/06*

U.S. Cl. 425—151 **3 Claims**

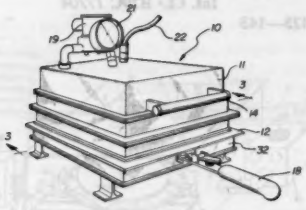
1. A molding press for molding a thermoplastic sheet material to a desired contour, said press comprising a base and a

rigid generally hollow housing overlying said base and movable vertically with respect thereto, said housing having an opening facing said base and a flexible sheet-like diaphragm covering said opening to from a fluid-tight chamber;

means for pressurizing said housing with a fluid to cause said flexible diaphragm to apply molding force to a sheet of softened thermoplastic material covering a mold positioned on said base to cause said sheet to assume the contours of said mold;

said press including mechanical interlock means for interlocking said housing with said base and electrical control means for controlling the application of fluid pressure to said housing, said mechanical and electrical means being interrelated to prevent application of fluid pressure except when said housing and said base are interlocked,

said mechanical interlock means comprising one or more vertical cleats attached to said housing and arranged to project into said base when said press is closed,



a horizontal plate carried in said base and rotatable about a vertical axis, and

one or more horizontal lock blades outwardly extending from said lock plate, each of said blades being adapted to interlock with a corresponding one of said cleats on rotation of said lock plate to prevent separation of said housing from said base;

said electrical control means comprising an electrical circuit including in series:

a power source,

an electrically actuated pneumatic control valve for regulating the application of pneumatic pressure to said chamber, and

at least one electrical switch actuated by said mechanical means,

whereby pneumatic pressure cannot be applied to said housing except when said housing and said base are interlocked.

4,047,871

DIE CLOSING UNIT FOR INJECTION MOLDING MACHINE

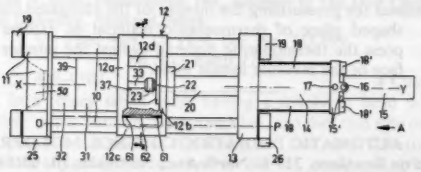
Karl Hehl, Arthur-Hehl-Strasse 32, 7298 Lossburg 1, Germany

Filed Sept. 4, 1975, Ser. No. 610,280

Claims priority, application Germany, Sept. 11, 1974, 2443509; Sept. 11, 1974, 2443510

Int. Cl.[2] B29F *1/06*

U.S. Cl. 425—450.1 **20 Claims**



1. A push-type die closing unit for an injection molding machine, serving to open and close the die halves of an injection molding die in a reciprocating motion along the longitudinal center axis of the unit, the die closing unit comprising in combination:

a stationary die carrier plate to which the stationary half of the injection molding die is attachable and which extends transversely to the unit center axis;

a stationary head plae likewise extending transversely to the unit center axis, on the other side of the emplacement of the injection molding die and at a distance therefrom;

a movable die carrier member to which the movable half of the injection molding die is attachable and which is arranged axially between the stationary die carrier plate and the staionary head plate;

means for guiding the movable die carrier member and attached die half in relation to the stationary die carrier plate and head plate for opening and closing movements along the unit center axis between a forward closed position and a rearward open position; and

a hydraulic linear actuator mounted axially behind the stationary head plate, said actuator including: a power cylinder enclosing a power piston having valve means for selectively hydraulically bypassing the power piston, an auxiliary cylinder extending coaxially to the rear of the power cylinder and enclosing an auxiliary piston, a piston rod carrying both said power piston and said auxiliary piston and extending in the unit center axis, the forward extremity of the piston rod being connected to the movable die carrier member for the transmission thereto of opening and closing forces, including elevated closing pressures; and wherein

the movable die carrier member defines, in the area immediately surrounding the unit center axis between the movable die half and the piston rod, a central space for the accommodation, at least in part, of an ejector device or other accessory device; and

the piston rod has a hollow forward portion accommodating therein an accessory drive in the form of an accessory hydraulic linear actuator to which said accessory device is connectable.

4,047,872

DEVICE ON PRESSING PISTON

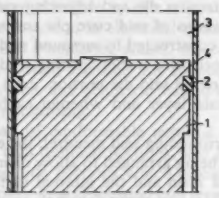
Hugo Karlsson, Kopmansgatan 17, S-820 60 Delsbo, Sweden

Filed Mar. 7, 1975, Ser. No. 556,343

Claims priority, application Sweden, Mar. 8, 1974, 7403094

Int. Cl.[2] B29C *1/00*

U.S. Cl. 425—469 **2 Claims**



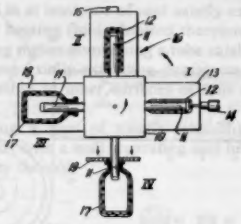
1. A device for compressing a wax-type material which comprises a chamber containing a piston movably disposed therein, at least a portion of the lateral surface of said piston containing a plurality of projecting members which extend from said lateral surface into sliding engagement with the wall of said chamber, said projecting member defining a plurality of channels therebetween for venting of gases produced during the compressing operation, wherein said piston is provided with a head portion containing a skirt having a continuous surface and said continuous surface of said skirt being provided with said projecting members, and said projecting members are arranged in a plurality of substantially parallel rows, with the projecting members in adjacent rows being staggered with respect to each other.

4,047,873

APPARATUS FOR MAKING MULTILAYERED BLOW MOLDED ARTICLES

John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.

Filed Dec. 15, 1975, Ser. No. 640,490
Int. Cl.[2] B29D 23/03
U.S. Cl. 425—523 20 Claims



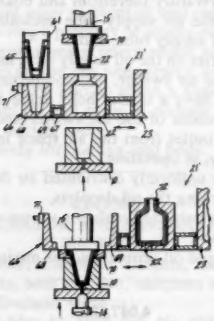
1. An apparatus for making a multi-layered hollow article comprising, a core rod, means operative to form a first parison on said core rod, a mold having a cavity larger than the formed parison and into which said core rod extends with said parison thereon, vacuum means operable to stretch the first parison radially and axially from the core rod so as to provide a cavity between the core rod and the first parison, and means operative to form a second parison in said cavity between the core rod and first parison so as to form a layered parison, the first parison being the outer layer and the second parison being the inner layer, and means operative to blow mold said layered parison to form the hollow article.

4,047,874

APPARATUS FOR THE PREPARATION OF PARISONS

Emery I. Valyi, 5200 Sycamore Ave., New York, N.Y. 10471

Division of Ser. No. 473,580, May 28, 1974, Pat. No. 3,966,378.
This application Dec. 17, 1975, Ser. No. 641,639
Int. Cl.[2] B29D 23/03
U.S. Cl. 425—523 10 Claims



1. An apparatus for the preparation of parisons comprised of more than one layer of moldable organic plastic material which comprises: a dispenser containing a quantity of parison liners; a core having an axis and being in spaced relation to said dispenser, and further being operable to receive a parison liner from said dispenser; a parison die in axial alignment with said core and engageable therewith, said parison die being operable to inject plastic around said core and liner; and means for conveying a parison liner from said dispenser into axial alignment with said core and said parison die, wherein said core is moved along its axis to receive said parison liner from said means then to engage said parison die by directionally uninterrupted relative axial movement, and means to blow mold the composite liner and injection molded layer.

4,047,875

INHIBITION OF CORROSION IN FUELS WITH MG/SI/MN COMBINATIONS

Walter R. May; Michael J. Zetlmeisl, and Kenneth W. Koch, all of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Nov. 24, 1975, Ser. No. 634,530
Int. Cl.[2] C10L 9/00
U.S. Cl. 431—3 6 Claims

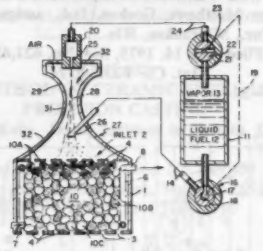
1. An additive composition comprising magnesium, silicon and manganese, in combination, wherein the (Mn/Mg+Si) ratio is from 0.01 to 100 and where the ratio of Mg to Si varies from 0.01 to 100.

4,047,876

CATALYTIC FUEL COMBUSTION APPARATUS AND METHOD

Richard E. Rice, Arlington, Mass., assignor to Comstock & Wescott, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 561,591, March 24, 1975. This application Aug. 1, 1975, Ser. No. 601,228
Int. Cl.[2] F23D 19/00
U.S. Cl. 431—7 53 Claims



1. Catalytic fuel combustion apparatus comprising:
a combustion chamber forming a fuel inlet and an outlet and a combustion path therebetween, and
a fuel- and air-permeable mass of catalyst in the chamber the mass including a relatively high catalytic concentration at the inlet and a relatively lower catalytic concentration is toward the outlet, wherein the mass of high concentration capable of spontaneous self-ignition in the presence of a lower alcohol selected from the group consisting of methanol, ethanol and isopropanol, the apparatus comprising means containing at least one of said lower alcohols and a pressurizer, and including means to form and direct droplets of said alcohol on said high catalyst concentration.

4,047,877

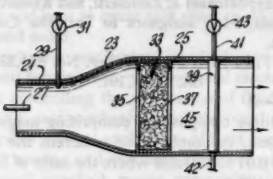
COMBUSTION METHOD AND APPARATUS

Paul Flanagan, Princeton, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Filed July 26, 1976, Ser. No. 708,557
Int. Cl.[2] F02C 3/16
U.S. Cl. 431—8 32 Claims

1. Combustion apparatus, comprising:
a catalyst body for combusting carbonaceous fuel passing therethrough;
feed means for supplying a mixture of combustion air and carbonaceous fuel to said catalyst body for flow therethrough to provide a catalyst effluent traversing a downstream zone adjacent to and downstream of said catalyst body;
thermal burner means disposed for directing jets of burning

gaseous fuel into said downstream zone from a multiplicity of points distributed within or alongside said downstream zone to obtain combustion of said gaseous fuel in said jets substantially throughout a cross section of said downstream zone; and



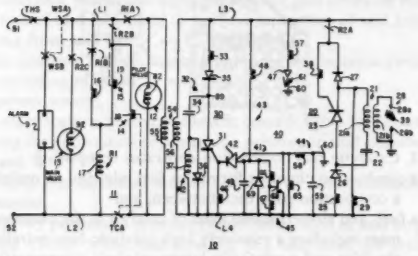
burner supply means for supplying gaseous fuel when desired to said burner means for obtaining said combustion in said jets substantially throughout a cross section of said downstream zone.

4,047,878

ELECTRONIC CONTROL ARRANGEMENT FOR DETECTING A LEAK CONDITION FOR A VALVE

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed Oct. 14, 1975, Ser. No. 621,653
Int. Cl.[2] F23N *5/24*
U.S. Cl. 431—22 **14 Claims**



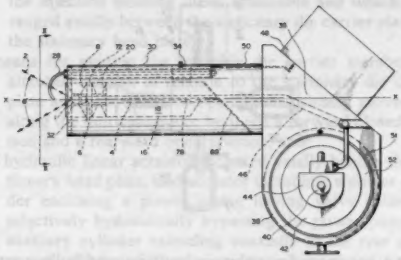
1. In an automatic fuel ignition system including pilot valve means operable when energized during an ignition interval to supply fuel to a pilot fuel outlet for ignition to establish a flame at said pilot outlet, and main valve means operable when energized to supply fuel to a main fuel outlet for ignition by said flame, a control arrangement comprising flame sensing means for sensing the presence of a flame at either one of said fuel outlets, control means operable in the absence of a flame at said pilot fuel outlet during a first duration following the start of the ignition interval to be responsive to said flame sensing means to energize said main valve means when a flame is established at said pilot fuel outlet, said control means maintaining said main valve means deenergized whenever a flame is established at said pilot fuel outlet during said first duration, and delay means operable whenever a flame is provided at said pilot fuel outlet during said first duration to deenergize and reenergize said pilot valve means to thereby interrupt the supply of fuel to said pilot fuel outlet for a predetermined duration, said control means being operable in the event the flame becomes extinguished as the result of operation of said delay means to respond to said flame sensing means to effect energization of said main valve means when a flame is thereafter reestablished at said pilot fuel outlet before the end of said ignition interval.

4,047,879

OIL BURNER ASSEMBLY

Earl R. Mitchell; Thomas D. Brown, and Beverley C. Post, all of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed June 3, 1976, Ser. No. 692,461
Claims priority, application Canada, June 27, 1975, 230344
Int. Cl.[2] F23C *5/06*
U S. Cl. 431—183 **4 Claims**



1. An oil burner assembly, comprising:

a. an atomizing nozzle for spraying oil droplets substantially as a symmetrical hollow cone having an included angle for the outside edge of the oil spray, when the oil is sprayed in still air, in the range 60° to 80°,

b. an oil supply tube connected to an oil inlet end of the atomizing nozzle, and having a longitudinal axis extending along the axis of symmetry of the hollow cone of oil droplets,

c. an air swirler around the atomizing nozzle and extending rearwardly from the spraying end thereof, the air swirler comprising a plurality of similar blades equally spaced around the atomizing nozzle and extending therearound at a helix angle in the range 50° to 65° to the axis of symmetry of the hollow cone of oil droplets with the edges of the blades adjacent the spraying end of the atomizing nozzle inclined in the direction of the hollow cone of oil droplets at an angle in the range 20° to 55° to the axis of symmetry of the hollow cone of oil droplets,

d. an air supply tube for supplying air to the air swirler and extending rearwardly therefrom and coaxial with the oil supply tube, the air supply tube enclosing an air space around the oil supply tube, and

e. an air pre-swirler on the oil supply tube, and spaced therealong from the air swirler, and comprising a plurality of blades which have a similar helix angle and direction of helix to the blades of the air swirler and which extend across an air outlet from the air space in the air supply tube, whereby, in operation,

f. a substantially uniformly distributed air flow is produced to a flame burning the oil droplets,

g. a substantially stable recirculation vortex within the flame is produced, and

h. a region of rapid oil droplet and air mixing is established.

4,047,880

FLUIDS DISTRIBUTOR FOR ENERGIZED-FLUID SYSTEMS

Antonio Caldarelli, 281 W. Clinton St., Dover, N.J. 07801

Division of Ser. No. 470,001, May 15, 1974, abandoned. This application Sept. 3, 1975, Ser. No. 610,047
Int. Cl.[2] F23D *11/44*; F02K *9/02*
U.S. Cl. 431—208 **6 Claims**

1. For use in energized-fluid systems, a distributor for receiving and discharging volatile fluids, comprising:

a body having an elongate axis;

said body further having a plurality of axially-extending passageways formed therein for conducting discrete fluids therethrough;

means carried by said body for admitting only one fluid to each passageway of said plurality of passageways;

an axially-extending bore formed in said body and opening out onto an end of said body;

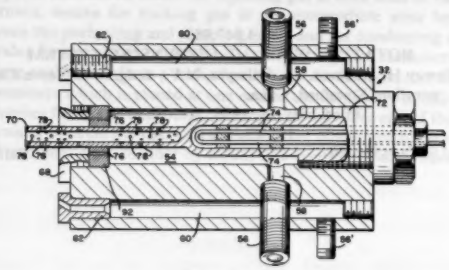
an ignition device confined within said bore;

conduits communicating at least one pair of said passageways with said bore, for conducting discrete fluids from said pair of passageways into said bore for contact with said ignition device;

means disposed in at least one of said axially-extending passageways for heating fluid admitted thereinto;

said fluid-heating means comprising a tube axially supported within said one axially-extending passageway in spaced-apart relationship to inner surfaces of said one passageway;

said tube having a pair of axially-extending tube-bores formed therein, with a wall separating said tube-bores one from the other thereof;



a heating element confined within one of said axially-extending tube-bores;

the other of said tube-bores having a multiplicity of apertures formed therein normal to the axis of said other tube-bore for admitting fluid therethrough into said other tube-bore, to effect a vaporization of such fluid upstream of, and prior to address of such fluid to, said ignition device;

said other tube-bore opening externally of said body, to discharge vaporized fluid therefrom;

an annulus enveloping a portion of said tube and in engagement with said inner surfaces of said one passageway;

said annulus having a plurality of axially-extending channels formed therein opening intermediate said tube and said inner surfaces of said one passageway, and opening externally of said body, also to effect a vaporization of such fluid upstream of, and prior to address of such fluid to, said ignition device; and

means in said body for cooling said body.

4,047,881

HEAT RECUPERATOR AND SHROUD FOR RADIANT TUBE BURNER

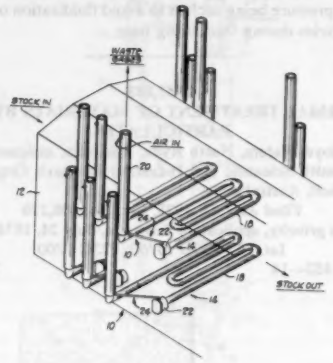
Paul R. Eschenauer, Cleveland Heights, and George Main, Garfield Heights, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed May 11, 1976, Ser. No. 685,287

Int. Cl.² F23D *11/44*

U.S. Cl. 431—215 **7 Claims**

1. A recuperator and shroud assembly for converting a radiant tube burner assembly that is comprised of a burner and a connected radiant tube from indirect air control to direct air control and for providing heat recuperation, comprising: a shroud attachable in surrounding relationship about the burner, in a manner that encloses an air inlet to the burner, said shroud having an inlet aperture and connected conduit for directing a flow of air under pressure in a direction transversely of, and at a location offset laterally from, the path of fuel flow from the burner and the central longitudinal axis of the adjacent radiant tube portion; a heat recuperator connected to a discharge portion of the radiant tube to receive a flow of hot gas therefrom, said heat recuperator having spaced inner and outer coaxial tubular members, one end of the inner member communicating with the discharge portion of the radiant tube and the other end serving as an exhaust opening, the outer member



being sealed at opposite ends about the inner member, one of the ends being sealed in sliding relationship and the other in fixed relationship, an inlet through the outer member adjacent one end, and an outlet adjacent the other end; and means connecting the shroud conduit to said last mentioned outlet.

4,047,882

BURNING METHOD OF CERAMIC SHELL MOLD FOR PRECISION CASTING

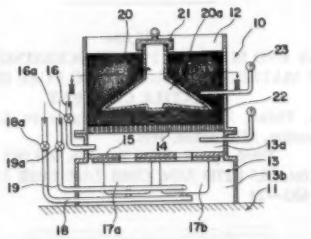
Yasuji Morita, Kobe, Japan, assignor to Kubota, Ltd., Osaka, Japan

Filed Mar. 22, 1976, Ser. No. 669,454

Claims priority, application Japan, Mar. 26, 1975, 50-37127

Int. Cl.² F27D *3/16*; F27B *15/00*

U.S. Cl. 432—9 **3 Claims**



1. A method of burning a ceramic shell mold for use in precision casting, which ceramic shell mold has a shaped cavity, defined therein, and at least one opening leading into said shaped mold cavity, said burning method being carried out by the use of a heating kiln of a type comprising heating and combustion compartments divided by a ceramic filter, said heating compartment being positioned immediately above said combustion compartment and accommodating therein a mass of sand, and a source of heating medium of elevated temperature, said burning method comprising the steps of:

positioning said ceramic shell mold from top into the mass of sand within the heating compartment while said mass of sand is fluidized by the application of compressed air flowing upwardly through the ceramic filter at a pressure within the range of 1.0 to 2.5 kg/cm², said ceramic shell mold being positioned such that the opening leading into the mold cavity projects outwardly from the top level of said mass of sand within said heating compartment;

interrupting the supply of the compressed air; and

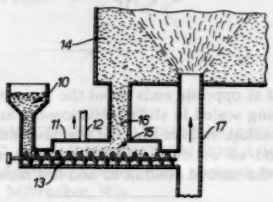
supplying the heating medium composed of a blast of hot gas from the combustion compartment into the heating compartment through said ceramic filter to heat said mass of sand and, in turn, said ceramic shell mold at a predetermined curing temperature for a predetermined time, said gas pressure being such as to avoid fluidization of the sand particles during this curing time.

4,047,883

THERMAL TREATMENT OF MATERIALS BY HOT PARTICULATES

Percy Lloyd Waters, North Ryde, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed July 23, 1975, Ser. No. 598,210
Claims priority, application Australia, July 24, 1974, 8310/74
Int. Cl.[2] F27B *15/00*; F23G *7/00*
U.S. Cl. 432—14 **19 Claims**



1. A method of heat treating a material which comprises the steps of:

a. removing hot solid particles from the bed of a particle bed combustor;

b. mixing the removed hot bed particles and said material in a mixing chamber; and

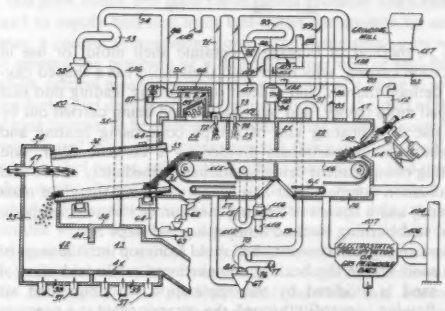
c. conveying at least part of the product of the admixture to the combustor.

4,047,884

MEANS AND METHOD FOR PROCESSING CEMENT RAW MATERIALS CONTAINING FUEL OF HIGH VOLATILE CONTENT

Glenn A. Heian, Franklin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Apr. 5, 1976, Ser. No. 674,062
Int. Cl.[2] F27D *7/04*; C04B *7/04*; C01B *17/96*
U.S. Cl. 432—21 **9 Claims**



1. In a method of processing raw cement material containing fuel of high volatile content in which the material is progressed through a drying zone and at least one preheat zone each of different temperatures and for a specific function wherein the temperature in the preheat zone is between 1200° F and 2400° F; comprising the steps of:

A. collecting the noncombusted volatiles from a collector in the windbox below the material bed in preheat zone;

B. combusting the collected volatiles of Step A in a combustion chamber; and,

C. passing the combusted volatiles as heat back to said preheat zones wherein preheating and calcining of the material being processed is effected.

4,047,885

ROTATING WICK OIL DISPENSING SYSTEM

Dewey H. Hauman, Jr., Palmyra, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 26, 1976, Ser. No. 690,212
Int. Cl.[2] F27B *9/28*
U.S. Cl. 432—60 **8 Claims**

1. Roll fuser apparatus comprising:

a heated roll structure;

a pressure roll structure cooperating with said heated roll structure to form a nip through which substrates carrying toner images thereon move;

means for effecting pressure engagement of said roll structures to form said nip during fusing of said toner images and for effecting disengagement thereof when images are not being fused;

means for applying release agent material to at least one of said roll structures for minimizing the offsetting of toner thereto, said means for applying release agent material comprising an endless surface only a portion of which contacts said at least one roll structure at any given time; and

means for effecting incremental movement of said release agent applying means whereby different portions of said endless surface are sequentially and periodically moved into contact with said at least one roll structure, said incremental movement effecting means being operably connected to said pressure engagement effecting means whereby movement of said release agent applying means

is effected in response to actuation of said means for effecting pressure engagement and disengagement of said roll structures.

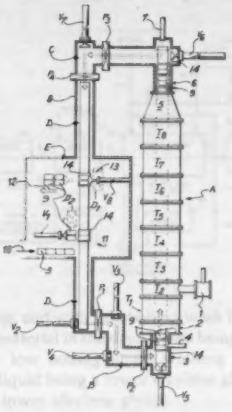
4,047,886

FURNACE FOR THE CONTINUOUS SINTERING OF PELLETS OF CERAMIC NUCLEAR FUEL MATERIAL

Jacques Heyraud, Aix-en-Provence, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 24, 1975, Ser. No. 634,629
Int. Cl.[2] F27B 9/02
U.S. Cl. 432—128 3 Claims

1. A furnace for the continuous sintering of pellets of ceramic nuclear fuel material in a neutral or reducing atmosphere, comprising a tubular enclosure having a longitudinal axis and equipped with heating means located at intervals along said enclosure, a hearth for the longitudinal displacement of pellet containers, means for injecting gas at both ends of the furnace, means for sucking gas in an intermediate zone between the preheating and sintering zones and for condensing a binder for the pellets, and means for displacing said containers along said hearth from a lock-chamber for the introduction of containers which is placed at one end of the furnace to a lock-chamber for the extraction of containers at the other end of the furnace, wherein the two lock-chambers are connected to each other in leak-tight manner by means of a conveyor belt which passes through a glove box, there being juxtaposed within said glove box a station for loading containers with sub-containers



which contain the pellets to be sintered and a station for unloading said sub-containers which contain the sintered pellets.

4,047,887
WHITENING OF POLYESTER FIBERS

Klaus Kackstadter, and Hans Theidel, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 22, 1975, Ser. No. 570,408
Claims priority, application Germany, Apr. 27, 1974, 2420473
Int. Cl.² D06P *5/20*
U.S. Cl. 8—1 W **5 Claims**

1. In the process for whitening polyester materials or mixed fibres of polyester and cellulose with a dispersion of a fluorescent coumarin or styryl whitening agent by the pad-thermosol process, the improvement comprising using said fluorescent whitening agent in a liquor also containing 1 to 4 g/l of a water-soluble inorganic salt from the group of alkali metal tetraborate, alkali metal silicate, alkali metal aluminum sulphate, alkali metal polyphosphate or alkali metal sulphate.

5. A composition of matter comprising a dispersion containing 60–250 g/kg. of fluorescent coumarin or styryl whitening agent and 150–200 g/kg of a water soluble inorganic salt of the formula

$$Me_2B_4O_7,\ Me_2SiO_3,\ Me_2Si_2O_5,\ MeAl(SO_4)_2,$$
$$Me_{m+2}P_mO_{3m+1},\ Me_nP_nO_{3n},\ \text{or}\ Me_2SO_4$$

in which
m is 2–10⁶;
n is 3–8; and
Me is sodium or potassium.

4,047,888
HAIR DYE COMPOSITION CONTAINING A CATIONIC RESIN

Christos Papantoniou, Epinay-sur-Seine, France, assignor to L'Oreal, Paris, France

Filed May 27, 1976, Ser. No. 690,783
Claims priority, application Luxembourg, May 28, 1975, 72592
Int. Cl.² A61K *7/13*
U.S. Cl. 8—10.2 **10 Claims**

1. A hair dye composition comprising a hair dye support in the form of a cream or gel, at least one oxidation dye in an amount between 0.006 and 6 percent by weight relative to the total weight of said composition and at least one graft cationic copolymer of:

a. 3–95 weight percent N-vinylpyrrolidone,
b. 3–95 weight percent dimethylaminoethyl methacrylate and
c. 2–50 weight percent polyethylene glycol,

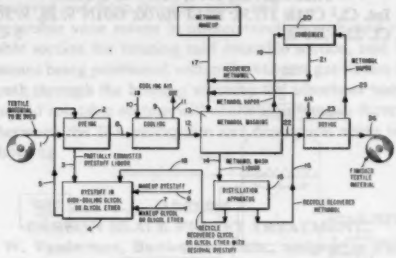
said graft cationic copolymer being present in an amount between 0.5 and 5 percent by weight based on the total weight of said composition and having a molecular weight between 10,000 and 100,000.

4,047,889
PROCESS FOR THE RAPID, CONTINUOUS AND WATERLESS DYEING OF TEXTILE AND PLASTIC MATERIALS

Julius Hermes, Martinsville, Va., assignor to Martin Processing, Inc., Martinsville, Va.

Filed Jan. 9, 1976, Ser. No. 647,775
Int. Cl.² C09B *67/00*; D06P *1/64*
U.S. Cl. 8—93 **6 Claims**

1. A process comprising dyeing a textile or plastic material with a dyestuff dissolved or suspended or dispersed in a high boiling organic liquid which is free or substantially free of water and at a relatively high temperature, followed by cooling the dyed textile or plastic material and washing same with a low boiling organic liquid which is free or substantially free of water, followed by drying the washed and dyed textile or plastic material, and carrying out the dyeing, the washing, and the drying steps in cyclic manner and in an essentially closed system with the partially exhausted dyestuff liquor from the dyeing step being recycled for the treatment of further textile or plastic material to be dyed, with the separation and recovery of used low boiling wash liquid with recovered low boiling wash liquid being recycled to the washing step and residual high boiling liquid containing residual dyestuff being recycled

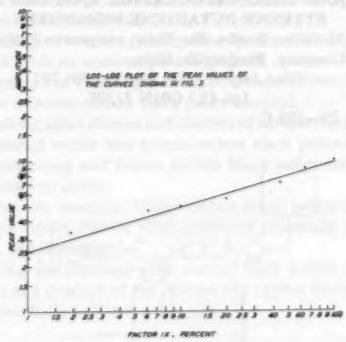


to the dyeing step, and with low boiling wash liquid vaporized from the textile material in the drying step being recovered and returned to the low boiling liquid washing step; said high boiling organic liquid being a lower alkylene glycol or a lower alkyl ether of a lower alkylene glycol.

4,047,890
METHOD AND APPARATUS FOR DETERMINING DEFICIENCIES IN ENZYMATIC REACTORS PARTICULARLY CLOTTING FACTOR LEVELS IN BLOOD PLASMAS

James W. Eichelberger, Plainfield, N.J.; Frederick M. Kent, Warrington, and Michael Sokol, Abington, both of Pa., assignors to Bio/Data Corporation, Willow Grove, Pa.

Continuation-in-part of Ser. No. 411,994, Nov. 1, 1973, abandoned. This application Mar. 21, 1975, Ser. No. 560,464
Int. Cl.² G01N *33/16*; G06F *15/42*
U.S. Cl. 23—230 B **12 Claims**



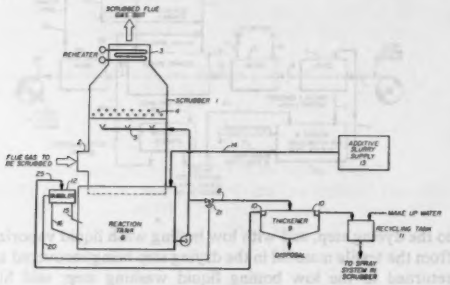
1. A method of determining clotting factor levels (other than fibrinogen) in blood plasma, comprising the steps of:

generating an electric signal proportional to the optical density of an unknown blood plasma undergoing clotting over a period of time;
electronically differentiating said optical density-time signal to generate a first differential signal;
electronically determining the peak value of said first differential signal; and, to determine clotting factor level activity of the unknown plasma;
electronically comparing said peak value to a predetermined standard logarithmic function based on standard plasmas having known factor activity levels, said standard logarithmic function relating the peak values of the first differential of the optical density-time signal of said standard plasmas to corresponding known factor activity levels.

4,047,891
DENSITY CONTROL SYSTEM

Adolph August Schuetz, East Hampton, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 21, 1976, Ser. No. 671,199
Int. Cl.[2] C01B 17/58; B01J 10/00; G01N 9/26, 9/36
U.S. Cl. 23—230 A 5 Claims



1. A method of manifesting the percent undissolved solids in a mixture of finely divided undissolved solids and liquid with dissolved solids, including,

establishing a collection of a mixture of finely divided undissolved solids and a first liquid with dissolved solids,

injecting a second liquid with only dissolved solids equivalent to the dissolved solids of the mixture at two different elevations in the collected mixture,

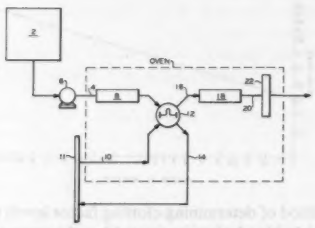
sensing the differential between the pressures required to inject the second liquid at the two different elevations,

and manifesting the differential pressures as the density of the mixture and percent undissolved solids in the mixture.

4,047,892
LIQUID CHROMATOGRAPHIC ANALYSIS FOR STYRENE-BUTADIENE MONOMERS

Edward N. Fuller, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 1, 1976, Ser. No. 701,727
Int. Cl.[2] G01N 31/08
U.S. Cl. 23—232 C 5 Claims



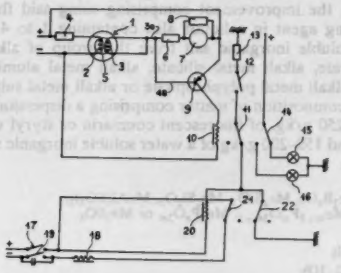
1. A process for the liquid chromatographic analysis of a mixture of styrene, 1,3-butadiene and cyclohexane which comprises:

introducing a sample of said mixture into a chromatographic column having a partitioning material therein which selectively retards passage therethrough of the components of said mixture, drying a carrier fluid by passing same through a drying chamber and thereafter introducing the thus-dried carrier fluid into said column at a predetermined flow rate to carry said mixture through said column to effect separation of said mixture into said styrene, said 1,3-butadiene and said cyclohexane, and thereafter separately determining the quantity of styrene, 1,3-butadiene and cyclohexane.

4,047,893
APPARATUS FOR MEASURING THE ALCOHOL CONTENT IN HUMAN BREATH

Bob Kok, and Erhardt Krause, both of Hamburg, Germany, assignors to C.S.S. Container Storage Service Establishment, Hamburg, Germany

Filed July 22, 1974, Ser. No. 490,294
Claims priority, application Germany, July 24, 1973, 2337988
Int. Cl.[2] G01N 27/16
U.S. Cl. 23—254 E 1 Claim



1. A portable hand-held apparatus for determining the alcohol content in the breath of a human subject, comprising, in combination, a gas chamber having an inlet into which the human subject can breathe and having at least one outlet; a low-voltage battery having first and second battery output terminals; first and second D.C. supply lines connected to said first and second battery output terminals; a gas cell mounted in said gas chamber and comprised of a porous semiconductor shell, a heating conductor embedded in said shell and connected to at least one of said supply lines, a probe embedded in said shell at a predetermined distance from said heating conductor, and a probe lead-in conductor connected to said probe, the resistance of said gas cell decreasing with increasing alcohol content of the gas present in said gas chamber; a milliammeter connected between said probe lead-in conductor and said first supply line for measuring and indicating the valve of the alcohol content in said gas; at least one transistor circuit each comprising a transistor and a relay, said transistor having a base connected to said probe lead-in conductor, an emitter connected to said first supply line, and a collector, said relay having a relay coil connected to said collector and said second supply line, at least one pair of relay contacts and at least one switch arm operated by said relay coil; at least one control circuit comprising a control lamp, one pair of said relay contacts being opened and closed by the corresponding relay switch arm and connected to cause said control lamp to light up when the current in the probe lead-in conductor exceeds a value corresponding to a predetermined alcohol content; and an adjustment resistor connected between said probe lead-in conductor and said first supply line and operative for adjusting the value of the probe lead-in conductor current at which said control lamp lights up, whereby a traffic officer or the like operating at night, in the rain, or in other low-visibility conditions, is informed by the control lamp that he should bother to take a precise alcohol content reading and is enabled by the milliammeter to thereafter actually take the reading.

4,047,894
REMOVING CARBON DIOXIDE FROM THE AIR

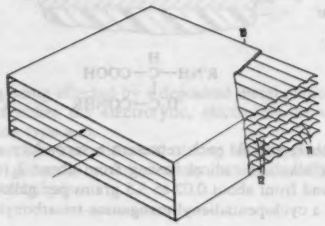
Dieter Kühl, Bubenreuth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 17, 1974, Ser. No. 470,905
Claims priority, application Germany, May 22, 1973, 2326070
Int. Cl.[2] B01J 1/00; C01B 31/20; H01M 8/06
U.S. Cl. 23—284 4 Claims

1. Apparatus for removing carbon dioxide from air comprising:

a. a housing opened on two opposing sides, said opposing sides forming an inlet and outlet for the air from which carbon dioxide is to be removed; and

b. a plurality of corrugated porous sintered plates of polyvinyl chloride impregnated with a carbon dioxide absorbing liquid supported within said housing in parallel spaced relationship to each other with the peaks and valleys of the corrugations also in parallel relationship to define a



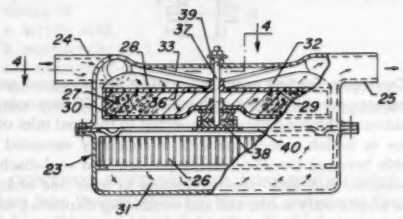
plurality of spaces, one between each two adjacent plates which spaces are open between said inlet and outlet, the corrugations extending transverse to the direction of flow of air from said inlet to said outlet, whereby the air is conducted through said spaces from said inlet to said outlet between the plates at right angles to the corrugations to result in a longer reaction time and larger surface area to give better material transfer between the air and absorption liquid without appreciable pressure loss.

4,047,895

APPARATUS FOR THE PURIFICATION OF ENGINE EXHAUST GASES WITHOUT OXIDATION OF ENTRAINED SO_2

Peter Urban, Northbrook, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 30, 1975, Ser. No. 627,161
Int. Cl.² B01J *8/04;* F01N *3/15, 3/16, 5/04*
U.S. Cl. 23—288 F **4 Claims**



1. A catalytic converter for purifying engine exhaust gases while preventing sulfur dioxide from contacting a catalyst to preclude the formation of sulfuric acid and which comprises in combination,

a. a confined housing with exhaust gas inlet means thereto and a purified gas outlet therefrom;

b. a gas permeable catalyst retaining section fixedly positioned within said housing;

c. a shaft supported by said housing an additional gas permeable section for retaining a SO_2 adsorbent material therein that is rotatably supported upon said shaft within said housing to be maintained adjacent said catalyst section in a manner to permit gas flow between said sections and to provide movement of said adsorbent material between an upstream adsorption zone and downstream desorption zone;

d. gas flow diverter means positioned in said converter to direct the incoming stream through the SO_2 adsorption zone and through a portion of said SO_2 adsorbent material so as to pass a substantially SO_2-free stream to said catalyst section and, in addition, to direct a treated stream from said catalyst section through said downstream description zone to remove SO_2 from another portion of the adsorbent material and from the converter, and

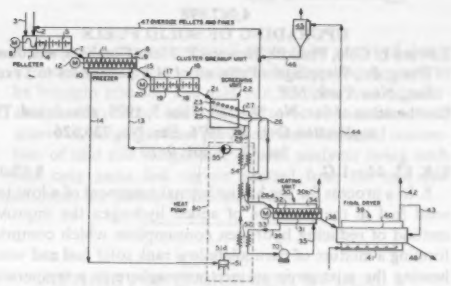
e. rotatable vane means in interconnection with said rotatable section for rotating said rotatable section, said vane means being positioned within the exhuast gas stream flow path through the housing whereby the adsorbent material in said rotatable section will continuously move therewith between the SO_2 adsorption and desorption zones in the housing.

4,047,896

CARBON BLACK PELLET TREATMENT

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 8, 1976, Ser. No. 693,995
Int. Cl.² C09C *1/58*
U.S. Cl. 23—314 **8 Claims**



1. A process for producing carbon black pellets of uniform pellet size which comprises:

A. forming wet carbon black pellets by wet-pelleting carbon black with an aqueous pelleting agent,

B. freezing the resulting wet carbon black pellets so as to form a frozen carbon black pellet material,

C. breaking apart clumps and clusters of carbon black pellets contained within said frozen carbon black pellet material by subjecting said frozen carbon black pellet material to mechanical action,

D. sizing the resulting frozen carbon black pellets so as to obtain frozen carbon black pellets of essentially uniform size, and thereafter

E. drying the resulting sized carbon black pellets so as to form as a product of the process dry carbon black pellets of essentially uniform pellet size.

4,047,897

SINTERED ALLOY FOR CUTTING TOOLS

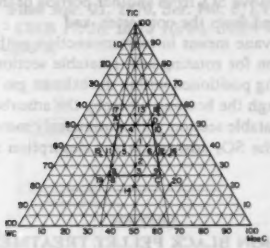
Hiroshi Tanaka, and Osamu Kato, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Oct. 13, 1976, Ser. No. 731,959
Claims priority, application Japan, Oct. 14, 1975, 50-123561
Int. Cl.² C22C *29/00*
U.S. Cl. 428—539.5 **1 Claim**

1. A sintered alloy for cutting tools consisting essentially of 60 to 92% by weight of a carbide comprising Mo_2C, WC and TiC in the proportions shown by the tetragonal region A, B, C and D in the ternary composition diagram of FIG. 1, the proportion of the sum of WC and Mo_2C with a WC/Mo_2C weight ratio of 35:65 to 65:35 being 50 to 75% by weight, and the proportion of TiC being 25 to 50% by weight;

3 to 20% by weight of a nitride selected from the group consisting of TiN, TaN or a mixture of TiN and TaN; and

5 to 20% by weight of Ni, Co or a mixture of Ni and Co as a binder metal; and wherein the carbide and nitride are in



the form of a solid solution phase nitride with a grain size of not more than 1.3 μ and a binder metal phase.

4,047,898

UPGRADING OF SOLID FUELS

Edward L. Cole, Fishkill; Howard V. Hess, Glenham, and James Wong, Jr., Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 583,387, June 3, 1975, abandoned. This application Oct. 28, 1976, Ser. No. 736,626

Int. Cl.[2] C10L *9/10*

U.S. Cl. 44—1 G **8 Claims**

1. In a process for the hydrothermal treatment of a low rank solid fuel in the presence of added hydrogen the improved method of reducing hydrogen consumption which comprises forming a mixture of particulate low rank solid fuel and water, heating the mixture in an inert atmosphere to a temperature between about 300° and 700° F. at a pressure sufficient to maintain the water liquid in the heating zone, venting the heating zone to release the generated gases and then subjecting the mixture to hydrothermal treatment at a temperature between about 300° and 700° F. and a pressure sufficient to maintain the water liquid in the hydrothermal zone in the presence of added hydrogen.

4. The process of claim **1** in which the solid fuel is lignite.

4,047,899

METHOD FOR PREPARING A LACTONE REACTION PRODUCT

Justin Christopher Powell, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 446,844, Feb. 28, 1974, Pat. No. 3,997,569, which is a continuation-in-part of Ser. No. 304,675, Nov. 8, 1972, abandoned. This application June 28, 1976, Ser. No. 700,360

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—63 **23 Claims**

11. A motor fuel composition comprising a mixture of hydrocarbons in the gasoline boiling range containing a deposit inhibiting amount of a high molecular weight alkenyl-substituted lactone reaction product prepared by the steps comprising admixing an alkenylsuccinic acid, said alkenyl radical having an average molecular weight ranging from about 300 to 3,000, with a protonating agent or electron pair acceptor selected from the group consisting of sulfuric acid, perchloric acid, p-toluene sulfonic acid, boron triflouride etherate and sulfonic acid ion exchange resins to form a substantially anhydrous reaction mixture and reaction said mixture under substantially anhydrous reaction conditions at an elevated temperature up to about 100° C until infrared spectra at about 5.66 and 5.74 micrometers indicates a substantial conversion of said alkenylsuccinic acid to said lactone reaction product.

4,047,900

MOTOR FUEL COMPOSITION

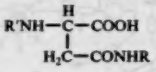
Peter Dorn, Lagrangeville, and Walter D. Foucher, Jr., Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,773

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—68 **6 Claims**

1. A motor fuel composition comprising a mixture of hydrocarbons in a gasoline boiling range containing from about 0.001 to 5.0 weight percent of a substituted asparagine having the formula:



in which R and R′ each represent a secondary or a tertiary alkyl or alkylene radical having from about 7 to 20 carbon atoms and from about 0.02 to 3.5 grams per gallon of manganese as a cyclopentadienyl manganese tricarbonyl.

4,047,901

FEEDER FOR COAL-GASIFICATION REACTOR

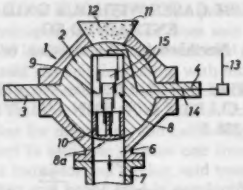
Gerhard Baron, Hofheim; Herbert Bierbach, Frankfurt am Main; Carl Hafke, Frankfurt am Main, and Karlheinz Zolzer, Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 13, 1976, Ser. No. 714,550

Claims priority, application Germany, Sept. 17, 1975, 2541356

Int. Cl.[2] C10J *3/30*

U.S. Cl. 48—86 R **4 Claims**



1. Device for feeding granular and dust coal to a coal-gasifying reactor operating under a pressure of 5 to 150 bars comprising stationary housing means connected to the coal inlet of the reactor in which a lock member is rotatably mounted and movable between a coal-receiving position and coal-discharging position, said lock member having at least one chamber which is open only at one end and containing displacing means which extends approximately to the entrance of the chamber, said displacing means consisting of a plurality of telescopic tubes which form a stem that extends and retracts and carries a sealing head within the chamber, thereby substantially preventing an ingress of product gas into the chamber when in the discharge position.

4,047,902

METAL-PLATED ABRASIVE PRODUCT AND METHOD OF MANUFACTURING THE PRODUCT

Richard K. Wiand, 1773 Washington, Birmingham, Mich. 48009

Continuation-in-part of Ser. No. 564,077, April 1, 1975, abandoned. This application June 24, 1976, Ser. No. 699,591

Int. Cl.[2] B24D *11/04*

U.S. Cl. 51—295 **10 Claims**

1. A method of manufacturing an abrasive product comprising,

providing a conductive member with a surface thereon for attachment of abrasive particles,

masking off predetermined desired surface portions on the

backing member to thereby leave exposed spaced apart portions on the backing,

a significant plurality of said abrasive grit particles positioned on each said exposed portions,

bonding generally non-ferromagnetic abrasive grit particles to the exposed portions subsequent to the masking, said

bonding being effected by a deposited metal plating technique of either the electrolytic, electroless, or vacuum deposition type and,

said grit particles and said metal plating being applied to the product generally simultaneously in a generally static plating technique.

4,047,903

PROCESS FOR THE PRODUCTION OF ABRASIVES

Wolfgang Hesse, Wiesbaden; Jurgen Ritz, Mainz-Mombach, and Eckart Teschner, Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 399,683, July 24, 1973, abandoned. This application Sept. 5, 1975, Ser. No. 610,679

Claims priority, application Germany, Sept. 26, 1972, 2247103

Int. Cl.[2] B05D *3/06*

U.S. Cl. 51—298 R **3 Claims**

1. A process for preparing a waterproof abrasive which comprises forming a waterproof abrasive by coating a fibrous substrate with a plurality of successive layers including at least one base layer of a binder resin hardenable by irradiation, at least one intermediate layer of abrasive grains and at least one top layer of binding resin hardenable by irradiation and thereafter curing the resin layers by electron irradiation; at least one of said resin layers being selected from the group consisting of

A. the reaction product of a polycarboxylic acid (A1) with an esterified epoxy resin (A2), prepared by reaction of an epoxy resin with a member selected from the goup consisting of

a. acrylic acid,

b. methacrylic acid,

c. a mixture of (a) and (b) and

B. the reaction product of (A2) first reacted with diketenes and then reacted with a chelate forming compound.

4,047,904

CONTROL SYSTEMS FOR ADSORBER UNITS

Michael John Worrall, Hockley, England, assignor to The British Ceca Company Limited, London, England

Filed Aug. 22, 1975, Ser. No. 607,080

Claims priority, application United Kingdom, Sept. 12, 1974, 39869/74

Int. Cl.[2] B01D *57/00*

U.S. Cl. 55—18 **7 Claims**

1. A vapor adsorber system consisting essentially of an inlet for air containing vapor to be adsorbed, a plurality of vapor adsorber units connected to said inlet, which are arranged to be utilized and regenerated in a sequence and which each include a respective exhaust outlet leading to atmosphere,

a respective sample line connected to each adsorber exhaust unit,

a sample exhaust line,

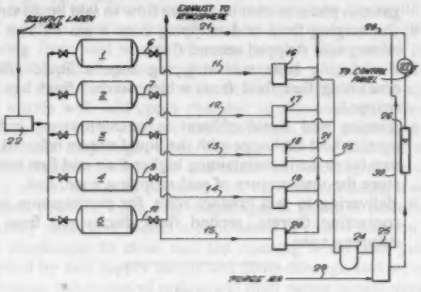
an analyzer line,

a plurality of first two way valves arranged respectively to connect selectively each said sample line to said sample exhaust line or direct to said analyzer line,

an analyzer means for detecting concentrations of vapor to be adsorbed in the ppm range,

a source of purge gas for said analyzer, valve means arranged to connect selectively said analyzer either to said analyzer line or to said source of purge gas, and

control means operative upon said two way valves to connect the sample line associated with one adsorber unit in use to said analyzer whilst connecting the sample lines associated with the other adsorber units to said sample exhaust line and operative in response to detection by said



analyzer of a concentration of vapor to be adsorbed above a predetermined level, to cause a further adsorber unit to be brought into use and said one adsorber unit regenerated, and to cause said analyzer to be connected to said source of purge gas for a predetermined time, said connection of said one sample line to said analyzer being such that only gases and vapors emitted from the said one adsorber are passed to the analyzer.

4,047,905

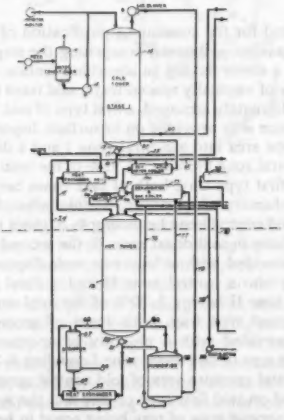
METHOD FOR ENRICHMENT BY DUAL TEMPERATURE EXCHANGE

Jerome S. Spevack, New Rochelle, N.Y., assignor to Deuterium Corporation, White Plains, N.Y.

Division of Ser. No. 587,362, Sept. 26, 1966, abandoned, which is a continuation of Ser. No. 822,975, June 25, 1959, abandoned, which is a division of Ser. No. 188,925, Sept. 29, 1950, Pat. No. 2,895,803. This application Jan. 5, 1971, Ser. No. 104,154

Int. Cl.[2] B01D *19/00;* **C01B** *5/02*

U.S. Cl. 55—37 **6 Claims**



1. An improved gas and liquid treating method wherein

a. a liquid stream containing first fluid and a gas stream containing second fluid are contacted with each other in a contact zone at a first temperature, and

b. the said liquid stream passing from the contact zone contains, and is thereafter stripped of second fluid dissolved therein,

said method being improved by

c. delivering to a separate stripping zone maintained at a temperature higher than said first temperature the liquid stream passing from said contact zone,

d. at said stripping zone stripping from said liquid stream second fluid dissolved therein by passing stripping fluid in gaseous phase in countercurrent flow to said liquid stream,

e. discharging from said stripping zone a gas effluent containing said stripped second fluid,

f. discharging from said stripping zone a liquid effluent containing first fluid from which second fluid has been stripped,

g. passing said liquid effluent in countercurrent indirect contact heat exchange with the liquid stream referred to in step (c) to aid in maintaining higher than said first temperature the temperature of said stripping zone, and

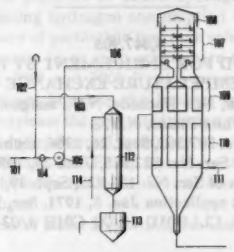
h. delivering to said contact zone, for participation in the contacting therein, second fluid discharged from said stripping zone.

4,047,906

METHOD FOR THE PURIFICATION OF WASTE GAS CONTAINING GASEOUS POLLUTANTS

Heiichiro Murakami, and Tsuneo Okamoto, both of Iwaki, Japan, assignors to Taiyo Kaken Company, Ltd., Tokyo, Japan

Filed Feb. 20, 1976, Ser. No. 659,901
Claims priority, application Japan, Feb. 27, 1975, 50-24262
Int. Cl.[2] B01D *53/12*
U.S. Cl. 55—79 **19 Claims**



1. A method for the continuous purification of a waste gas containing gaseous pollutants, comprising the steps of:

providing a tower having an absorbing section containing a plurality of vertically spaced trays, said trays being of two types, alternately arranged, a first type of said trays having at least one weir provided on its surface disposed to divide its surface area into a central zone I and a distal zone II, said central zone I having 80–95% of the total surface area of said first type tray, both of said zones being provided with a plurality of apertures, the total area of the apparatus of said central zone I equaling 4–20 times the total area of apertures in said distal zone II, the second type of tray being provided with at least one weir disposed to divide the tray into a central zone II and a distal zone I, said central zone II having 5–20% of the total surface area of said second type tray, both zones of second type tray being provided with a plurality of apertures, the total aperture area of said distal zone I equaling 4–20 times that of the total aperture area of said central zone II, the weir provided on said first type of tray and the weir provided on said second type of tray being equal in height;

continually introducing the gas to be purified into a lower section of the tower beneath said adsorption section;

continuously feeding activated carbon spheres onto the top tray of said tower, said carbon spheres and said gas coming into countercurrent contact, said carbon spheres forming a fluidized bed in zone I of each tray and descending through zone II to the next lower tray; and

continuously removing purified gas from the top of said tower.

10. A method for the continuous purification of a waste gas containing gaseous pollutants, comprising the steps of:

providing a tower having an adsorbing section containing a plurality of vertically spaced trays, each of said trays being divided by at least one weir into first and second zones, each zone having a plurality of apertures, each first zone having 80–95% of the total surface area of the tray and a total aperture area 4–20 times the total aperture area in said second zone,

continually introducing the gas to be purified into a lower section of the tower beneath said adsorption section;

continuously feeding activated carbon spheres onto the top tray of said tower, said carbon spheres and said gas coming into countercurrent contact, said carbon forming a fluidized bed in said first zone of each tray and descending through said second zone to the next lower tray; and

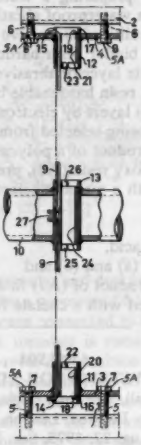
continuously removing purified gas from the top of said tower.

4,047,907

DUST SEPARATOR APPARATUS

Filip Knutsson, and Lars Bergström, both of Vaxjo, Sweden, assignors to AB Svenska Flaktfabriken, Nacka, Sweden

Filed Nov. 26, 1975, Ser. No. 635,272
Claims priority, application Germany, Dec. 4, 1974, 2457255
Int. Cl.[2] B03C *3/41*
U.S. Cl. 55—147 **14 Claims**



1. In a discharge electrode assembly comprising a holder, a discharge electrode, and securing means for securing an end of said electrode to said holder, the improvement wherein

said discharge electrode has a dove-tail shaped end which has flared angled edges which are angled about a longitudinal axis therein to form a dihedral angle in cross section, and

said securing means comprises a bifuracated shoe, for receiving and holding said dove-tail end of said electrode,

said shoe comprising a web and a pair of spaced-apart legs, said legs extending generally in the same direction from opposite ends of said web, one side edge of said web and one side edge of said legs being affixed to said support member,

the transitions between each of said legs and said web forming opposed internal channels for receiving and retaining the flared angled edges of said dove-tail end, said channels

extending at substantially the same angle as the corresponding ones of said flared edges,

whereby said electrode can be installed by slipping said flared angled edges between said legs and into a position between said channels and then urging said electrode longitudinally to establish mating contact between said flared angled edges and said channels.

4,047,908

GAS SEPARATION MEMBRANE

Edward F. Steigelmann, and Robert D. Hughes, both of Park Forest, Ill., assignors to Standard Oil Company, Chicago, Ill.

Division of Ser. No. 365,203, May 30, 1973, Pat. No. 3,865,890, which is a continuation-in-part of Ser. No. 335,012, Feb. 23, 1973, abandoned. This application Aug. 14, 1974, Ser. No. 497,481

Int. Cl.² B01D *53/22*

U.S. Cl. 55—158 **10 Claims**

1. A hydrophilic, semi-permeable, water-insoluble, film membrane comprising a grafted copolymer consisting essentially of nylon having polyvinyl alcohol grafted thereto, said membrane having therein a metal component which in the presence of water will provide cations that are capable of forming a complex with aliphatically-unsaturated hydrocarbons.

4,047,909

VALVE SYSTEM PARTICULARLY FOR APPARATUS FOR PRODUCING DRY COMPRESSED AIR

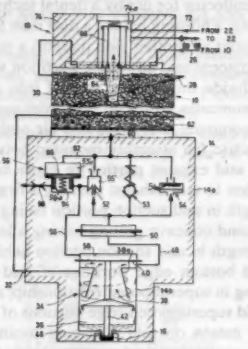
Hans-Joachim Hofmann, Geradstetten, Germany, assignor to Durr-Dental KG., Germany

Filed Apr. 18, 1975, Ser. No. 569,449

Claims priority, application Germany, Apr. 20, 1974, 2419177

Int. Cl.² B01D *35/00*

U.S. Cl. 55—184 **19 Claims**



14. In a system for producing dry compressed gas, comprising means for supplying compressed gas, means for storing dry compressed gas, liquid separator means, filter means including adsorption filter means and having an inlet, and first passage means connecting said separator means and filter means sequentially between said supply means and said storing means for communication therewith; the improvement comprising a pneumatic valve control system in combination with said separator means, said separator means and valve control system comprising housing means providing a cavity, a flexible diaphragm dividing said cavity into an upper chamber and a lower chamber having an inlet and an outlet, said first passage means including means connecting said inlet of said lower chamber with said supply means, baffle means disposed in said lower chamber between said inlet and outlet for separating liquid from said gas, said liquid collecting in said lower chamber, a tap opening in the bottom of said lower chamber, valve means associated with said tap opening and movable between an open position for opening said tap opening and a closed position for closing said tap opening, means connecting said valve means with said diaphragm for movement by said diaphragm between open and closed position, a suction ejection nozzle having a suction chamber in which a reduced pressure is produced by flow of gas through said nozzle, said first passage means further including means connecting said suction ejection nozzle between said outlet of said lower chamber and said inlet of said filter means in communication therewith so that said gas flowing through said suction ejection nozzle in flowing from said separator means to said filter means produces a reduced pressure in said suction chamber, second passage means connecting said suction chamber of said ejection nozzle with said upper chamber in communication therewith to provide a pressure differential on said diaphragm to deflect said diaphragm when there is a flow of said gas at a predetermined rate through said nozzle and thereby move said valve means to closed position, said valve means being biased to open position when said diaphragm is not thus deflected, whereby said valve means is maintained in closed position by said diaphragm to close said tap opening when said gas is supplied by said supply means and flows through said separator means, valve control system and filter means to said storing means, and is moved to open position, when said gas is not so supplied, to open said tap opening to drain said collected liquid from said lower chamber and to permit back flow of said gas from said storing means through said filter means to regenerate said adsorption filter means.

4,047,910

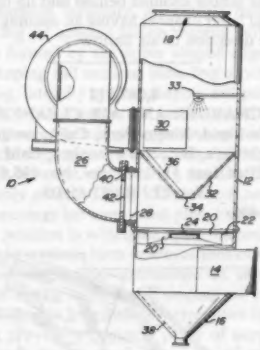
APPARATUS FOR COLLECTING FINE PARTICLES

Harry Krockta, E. Northport, N.Y., assignor to The Ducon Company, Inc., Mineola, N.Y.

Filed May 21, 1976, Ser. No. 688,801

Int. Cl.² B01D *47/10*

U.S. Cl. 55—235 **2 Claims**



1. Apparatus for collecting fine particles from a gas stream including an upright elongated generally cylindrical scrubber having a means for introducing a scrubbing liquid, a tangential gas inlet for dust laden gas in the bottom portion of said scrubber, radially extending baffle means at an elevation in said scrubber above the elevation of said gas inlet, said baffle means including a plurality of inclined vanes forming passageways for imparting rotary motion to gas introduced through said gas inlet, a duct having its entrance and exit communicating with said scrubber, said duct entrance being above the elevation of said vanes, said duct exit being at an elevation above the elevation of said duct entrance, dynamic separation and impelling means in said duct including a rapidly rotating means an orifice plate in said duct for reducing the cross-sectional area of said duct by a substantial amount to create turbulence and improved contact between said scrubbing liquid and said particles in said duct upstream of said impelling means, said duct

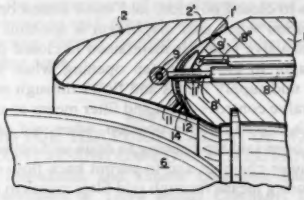
being of uniform cross section between said plate and said impelling means, and said scrubber having a clean gas outlet above the elevation of said duct exit.

4,047,911

AIR INTAKE WITH DEFLECTING DEVICE AGAINST FOREIGN OBJECTS IMPINGING IN THE INITIAL DIRECTION OF AIR FLOW AT ENGINE NACELLES

Hubert Krojer, Kippenhausen, Germany, assignor to Dornier GmbH, Germany

Continuation of Ser. No. 440,576, Feb. 7, 1974, abandoned. This application Dec. 30, 1974, Ser. No. 537,447
Claims priority, application Germany, Apr. 12, 1973, 2318380
Int. Cl.[2] B01D *46/00*
U.S. Cl. 55—306 **5 Claims**



1. In an air intake for an aircraft engine, particularly a prop-jet engine, which intake is annular at the forward part thereof and has a central, non-rotatable body with a convex surface mounted in said intake,

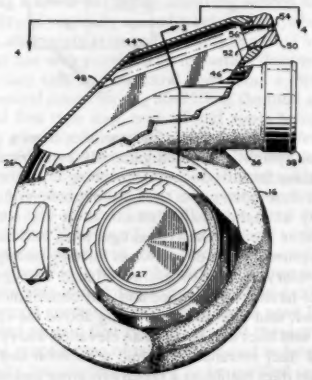
the improvement which comprises displaceable annular inlet lip means, having a concave inner surface, on said intake, said lip means being diplaceable to sealing contact against said central body and against the direction of air onflow, whereby a first air inflow channel is closed to air and a second air inflow channel behind said lip means is opened to air, said latter channel having an opening pointing away from the direction of air onflow.

4,047,912

TURBOCHARGER AND AIR CLEANER DEVICE

R. Donald Markland, Menlo Park, Calif., assignor to Consolidated Freightways, Inc., San Francisco, Calif.

Filed June 11, 1976, Ser. No. 695,070
Int. Cl.[2] B01D *45/00*
U.S. Cl. 55—406 **5 Claims**



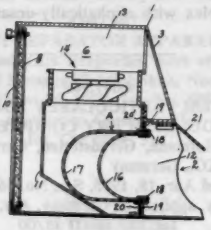
1. An air cleaner and turbocharger device comprising a turbocharger housing including an inlet and enclosing a rotary impeller, said housing being a volute-shaped diffuser into which air is compressed by the impeller, said diffuser having a tangential gas discharge port, means forming a collection spout extending outwardly from the periphery of the diffuser and the gas discharge port for trapping and collecting foreign matter carried in a stream of air rotating within the diffuser, and a nozzle mounted in the discharge end of the spout, said nozzle being formed with an opening sized larger than said foreign matter for expelling the collected foreign matter from the spout, said opening being sized substantially less than the diameter of the collection spout for restricting air leakage through the nozzle for minimizing pressure loss within the diffuser and thereby maintaining boost pressure in the discharge port of the diffuser.

4,047,913

DUST COLLECTOR FOR DENTAL TECHNICIAN

Sosuke Okumura, Musashimurayama, Japan, assignor to Yutaka Denki Saisakusho, Tokyo, Japan

Filed June 17, 1976, Ser. No. 697,257
Claims priority, application Japan, Jan. 8, 1975, 50-107505
Int. Cl.[2] B01D *50/00*
U.S. Cl. 55—418 **10 Claims**



1. A dust collector for use by a dental technician, the collector comprising: a housing having a dust inlet at one side thereof and an air outlet at another side thereof; a porous outlet filter positioned adjacent said air outlet; partition wall means in said housing to divide the interior thereof into a suction portion which communicates with said dust inlet and an exhaust portion which communicates with said air outlet via said outlet filter; an electric fan assembly mounted between said suction portion and said exhaust portion to cause air flow from said suction portion to said exhaust portion; a first concave grating of given length in said suction portion facing said dust inlet; at least one second concave grating having a length greater than said given length in said suction portion behind said first grating, top and bottom edge portions of said first and second gratings being in superimposed relationship; means clampingly receiving said superimposed edge portions of said gratings, and cooperating means on said clamping means in said suction portion for positioning said gratings in said suction portion across said dust inlet.

4,047,914

INTERNALLY SUPPORTED MULTI-STAGE SLEEVE FILTER

Elwood F. Hansen, Allendale; Arnold Goldberg, Fair Lawn; Henry Zenzie, Princeton, and Kermit Giroward, Scotch Plains, all of N.J., assignors to Drico Industrial Corporation, Wallington, N.J.

Filed Sept. 27, 1976, Ser. No. 727,204
Int. Cl.[2] B01D *46/02*
U.S. Cl. 55—488 **9 Claims**

1. A self-supporting, self-gasketing, multi-stage, variable density fiber glass sleeve filter of rectangular configuration comprising:

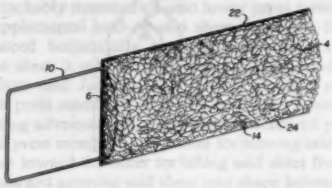
a. a rigid, rectangular, internal reusable wire frame;

b. a composite, low velocity, fluid entry filter member on one side of said frame having a first fluid permeable,

puffed glass fiber outer filter layer and a second fluid permeable, puffed glass fiber inner filter layer contiguous with said first filter layer and positioned inwardly thereof;

c. said first fluid permeable filter layer defining the fluid entry surface of the filter and having a thickness and density less than the thickness and density of said second fluid permeable filter layer;

d. a fluid egress member disposed on the other side of said frame comprising a flat, fibrous surfacing mat having a thickness less than the thickness of either of the layers of said entry filter;



e. said entry filter member and said egress filter member each extending transversely beyond the longitudinal edges of said frame and being joined to one another by stitching exteriorly of said frame along longitudinal edge portions on opposed sides thereof so as to form an open ended sleeve that can be slid on and off of said reusable frame; and

f. said sleeve being dimensional such that when it is slid onto said frame, the fluid entry layer is tensioned across said wire frame and assumes an outwardly curved configuration with respect to said fluid egress member, said fluid egress member lying flat and tensioned across said frame.

4,047,915

METHOD OF MANUFACTURING GLASS VACUUM ENVELOPES

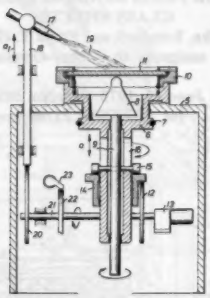
Klaus Schaffernicht, Herrlingen; Josef Hentrich, Ulm; Herbert Klein, Ulm, and Karl-Heinz Kuckenburg, Ulm, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed June 23, 1976, Ser. No. 698,818

Claims priority, application Germany, June 26, 1975, 2528421

Int. Cl.[2] C03B *23/02*

U.S. Cl. 65—106 **15 Claims**



1. A method of manufacturing vacuum casings or vacuum casing parts made of glass for electronic valves, particularly cathode ray tubes, in which a substantially plane glass plate is heated beyond the softening point and is deformed by means of an appropriately moulded stamp, characterised in that said glass plate is clamped at the circumference at least at several points; that the free part of said glass plate is heated; that when said glass plate begins to soften, said stamp is pressed against said glass plate perpendicular to the plane of extension of said glass plate; that said stamp is moved on in the pressing direction relative to said clamping points with further supply of heat at the same time, wherein the glass of said plate substantially abuts the end surface and the side surfaces of said stamp while at the same time the thickness of said glass becomes thinner; and that after at least partial cooling of the moulded glass body has taken place, and after removal of said stamp and release of the clamping points, at least the edge which has been formed by clamping is removed.

4,047,916

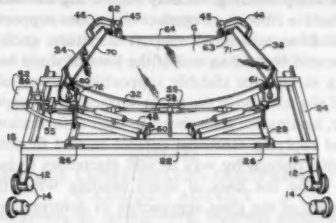
METHOD AND APPARATUS FOR BENDING GLASS SHEETS TO DOUBLE V-BENDS

Thomas J. Reese, Sarver; James R. Mortimer, Natrona Heights; Melvin W. Tobin, New Kensington, and Stephen J. D. Jursa, Saxonburg, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 21, 1976, Ser. No. 725,054

Int. Cl.[2] C03B *23/02*

U.S. Cl. 65—106 **8 Claims**



1. A sectionalized bending mold of the outline type for supporting glass sheets during sag bending the glass to a double V-type of bend including two lines of sharp bending comprising a mold support structure, an outline mold of concave elevation having an upward facing shaping surface of outline configuration formed by the upper shaped edge surfaces of a plurality of shaping rail sections including a pair of longitudinally extending, laterally spaced shaping rail portions forming a central mold section supported on said mold support structure, a pair of bearing housings supported by said mold support structure in laterally spaced relation to define a transversely extending line between said bearing housings, an end mold section pivotably mounted for rotation about each said pair of said bearing housings between a flat glass loading position and a closed mold position in which the upper shaped edge surfaces of said end mold sections form continuations of the upper edge surface of the longitudinal extremities of said shaping rail portions of said center section, said shaping rail portions of said section terminating in longitudinal extremities lying in a common plane to provide a common plane of support for a flat glass sheet, each longitudinal extremity of each elongated shaping rail portion of the central mold section being aligned with a corresponding longitudinal extremity of the other shaping rail portion of said central mold section along a transverse line, a contact electrode supported on and insulated from said mold support structure and located laterally outside each longitudinal extremity of each said longitudinally extending shaping rail portion and having a surface for slideably supporting a ribbon slightly above said transverse line and aligned therewith, and means carried by the mold support structure in insulated relation to said mold and mold support structure adapted for electrical connection to a source of electrical potential at one end and to said electrodes at the other end, a removable, flexible electroconductive ribbon movably supported on the said surface of each said laterally spaced pairs of electrodes and bridging the space between said laterally spaced electrodes of each said pair of electrodes, and weight means attached to said ribbon laterally outside each said electrode to

support said ribbon in sliding relation to said surfaces of said electrodes and to prevent sagging of said ribbon between said electrodes, whereby said ribbon is maintained out of contact with said glass during sag bending.

4. A method of bending glass sheets to a sharp bend of double-V configuration including sharply bent end portions adjacent each of the longitudinal extremities thereof, said method comprising mounting a pair of glass sheets in superimposed aligned relation to one another over a sectionalized bending mold having a center mold section comprising longitudinally extending rail portions and end mold sections pivotably mounted with respect to said center mold section so that said glass sheets are supported on said longitudinal extremities of the center mold section and on the outer longitudinal extremities of said end mold sections, mounting a flexible, electroconductive ribbon in closely spaced relation over the glass sheets along a line aligned with each line of sharp bending desired for the glass sheet after bending, tensioning the flexible electroconductive ribbons so that they are maintained along lines transverse to said mold and spaced a short distance above the upper surface of the upper glass sheet along the lines desired for sharp bending, slidably supporting the flexible, electroconductive ribbons on contact electrodes supported on and insulated from said mold support structure, each electrode being located beyond an end of the lines of sharp bending and having a surface for slidably supporting one of said ribbons disposed slightly above the upper surface of the upper sheet of said pair, heating the glass sheets to their deformation temperature, and applying electrical current to said flexible, electroconductive ribbons by way of said electrodes to increase the heating along the lines of sharp bending when the overall temperature of the glass approaches its deformation temperature so that said glass sheets sag sharply along said transversely extending lines of sharp bending to conform to the shaping surface of said mold and the end mold sections pivot to form a continuous shaping surface conforming in elevation and outline to the shape desired for the glass sheet sagged onto said mold.

4,047,917

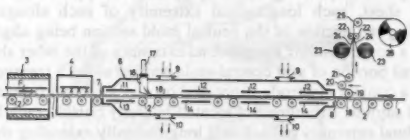
APPARATUS FOR THE MANUFACTURE OF PLASTICS FILM BY CASTING ON A FLOATING GLASS RIBBON

Pierre Rene Heymes, Paris, France, and Rudolf Pelzer, Herzogenrath, Germany, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Division of Ser. No. 541,099, Jan. 15, 1975, Pat. No. 3,990,876. This application Sept. 20, 1976, Ser. No. 725,120

Int. Cl.² C03B *13/14, 18/02*

U.S. Cl. 65—146 **7 Claims**



1. Apparatus for making sheets of transparent plastics material having high optical quality, which comprises fabrication means for making a ribbon of glass by the float glass process, means for continuously transporting the glass ribbon in a horizontal direction from the fabrication means, means for cooling the ribbon after the ribbon leaves the fabrication means, a coating head for depositing a liquid composition capable of solidifying to form a solid plastics sheet on the upper surface of the cooled transported ribbon, and means for removing the plastics sheet as a continuous strip.

4,047,918

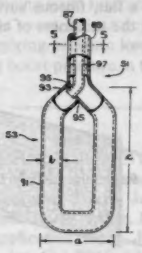
WATER COOLED GLASS STIRRER

Robert B. Heithoff, Wichita Falls, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 2, 1976, Ser. No. 711,017

Int. Cl.² C03B *5/18*

U.S. Cl. 65—179 **7 Claims**



1. In a horizontal glassmaking furnace for melting, refining and conditioning glass for discharge to a flat glass forming process comprising a melter and a refiner joined through a waist having substantially less width than either the melter or refiner and including a plurality of glass stirring means positioned in the furnace waist for homogenizing molten glass passing through the waist prior to being conditioned for discharge, the improvement which comprises

a transverse row of at least four mixing paddles, each rotatably mounted for rotation about its axis, wherein

each mixing paddle includes an axial section comprising two coaxial iron or steel pipes, an inner pipe and an outer pipe, having an annular space between them and a mixing end section comprising an open bent loop having at the upper ends thereof inlet and outlet openings, said bent loop extending below said coaxial inner and outer pipes and said bent loop being connected to the ends of coaxial pipes for providing flow of coolant substantially throughout the length of the annular space; of the inner pipe and of the bent loop,

means for rotating said mixing paddles, and

means for supplying coolant to said paddles during their rotation.

4,047,919

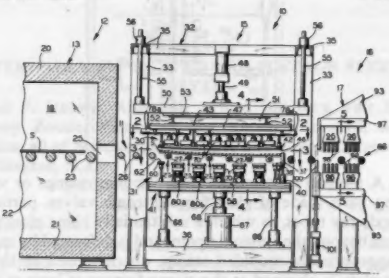
APPARATUS FOR PRESS BENDING RELATIVELY THIN GLASS SHEETS

Waldemar W. Oelke, Rossford, and Floyd T. Hagedorn, Oregon, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed June 23, 1975, Ser. No. 589,020

Int. Cl.² C03B *23/02*

U.S. Cl. 65—273 **6 Claims**



1. Apparatus for bending and heat treating relatively thin

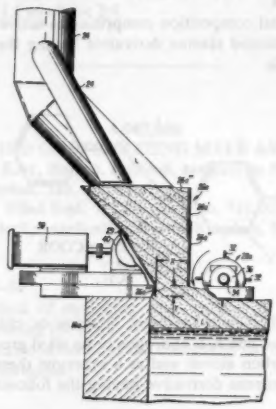
glass sheets comprising: means including a furnace for heating a flat sheet of glass to substantially the softening point thereof, means including spaced conveyor rolls for supporting and conveying said heated sheet in a horizontal plane and moving the same in a generally horizontal path from said furnace toward and between opposed lower and upper horizontally disposed press members located exteriorly of said furnace and having complemental shaping surfaces, said lower press member having a shaping rail constituting the shaping surface thereof and formed of a plurality of spaced apart segments permitting passage of said shaping rail past said conveyor rolls upon vertical movement relative thereto, a plurality of heating elements detachably mounted on said lower press member for applying supplemental heat to said sheet while the latter is being advanced horizontally between said press members whereby the sheet is substantially continuously heated while conveyed from said furnace to a desired bending position between said press members, means on said lower press member interrupting advancement of said sheet in a desired position between said press members, and means for moving said lower press member toward the other for lifting said sheet from said conveyor rolls and pressing said sheet into shape between said complemental shaping surfaces, said heating elements movable along with said lower press member to maintain a constant spacing between said heating elements and said sheet upon vertical movement of said lower press member, said heating elements being arranged in spaced rows extending generally parallel to the axes of said conveyor rolls and offset therefrom to provide clearance for said rolls upon vertical movement of said lower press member.

4,047,920

APPARATUS FOR CHARGING AN ELECTRIC GLASS FURNACE AND METHOD OF COMPLETELY DISTRIBUTING GLASS BATCH OVER THE SURFACE OF MOLTEN GLASS IN AN ELECTRIC GLASS FURNACE

Thomas M. Armstrong, Chattanooga, Tenn., assignor to Chattanooga Glass Company, Chattanooga, Tenn.

Filed Aug. 5, 1976, Ser. No. 711,867
Int. Cl.² C03B *3/00, 13/00*
U.S. Cl. 65—335 **9 Claims**



1. An apparatus for charging an electric glass furnace having opposing end walls and opposing sidewalls, said apparatus comprising:

stationary means for discharging a gravitating bed of glass batch onto the surface of molten glass in the furnace along one end wall thereof in a zone extending substantially from one sidewall to the other, and

two pushers parallel and adjacent to but spaced from the said stationary means for pushing succeeding portions of the batch resting on the molten glass along the surface of said molten glass toward the opposing end wall, said pushers being substantially axially aligned but axially spaced from each other and from said sidewalls.

4,047,921

TREATING MICRO-NUTRIENT DEFICIENCIES IN PLANTS

Volker Mues, Wuppertal, and Johannes Niggemann, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 18, 1976, Ser. No. 668,151
Claims priority, application Germany, Mar. 22, 1975, 2512816; Nov. 13, 1975, 2550935
Int. Cl.² C05F *11/00*
U.S. Cl. 71—11 **8 Claims**

1. A method of supplying plants with micro-nutrients, which comprises applying to the plants or a plant habitat, an effective amount of a prussiate of the formula

$$M_a[Fe(CN)_5X]_b$$

in which

M is an alkali metal ion, alkaline earth metal ion, heavy metal ion, ammonium ion or hydrogen,

X is a group which can occupy the sixth coordination position on the iron, or a suitable organic radical,

a is 2, 3, 4 or 5, and

b is 1, 2 or 3.

4,047,922

SLOW RELEASE COMPOSITION COMPRISING SLACK WAX-UREA ADDUCT

Walter Van Neste, St. Amandsberg, Belgium, assignor to S.A. Texaco Belgium N.V., Brussels, Belgium

Filed Mar. 8, 1976, Ser. No. 664,447
Int. Cl.² C05C *9/00*
U.S. Cl. 71—28 **4 Claims**

1. A slow release fertilizer composition adapted for use on dry, desert-type soils comprising a solvent-dewaxes slack wax-urea adduct having a wax-to-urea ratio of about 1 to 5 containing from 92.5 to 60 percent by weight of urea, balance wax, said adduct containing no more than about 0.1 weight percent of solvent, said wax having a melting point such as to melt under solar radiation to slowly release said urea and form a biodegradable protective layer against wind erosion and water loss from said soils.

4,047,923

HETEROCYCLIC SULFONIUM SALT CONTAINING PLANT-GROWTH REGULANT COMPOSITIONS

Klaus Naumann, Cologne; Klaus Lurssen, Grosskoenigsdorf, and Klaus Sasse, Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 476,760, June 5, 1974. This application June 18, 1975, Ser. No. 588,083
Claims priority, application Germany, June 19, 1973, 2331185
Int. Cl.² A01N *5/00*
U.S. Cl. 71—76 **9 Claims**

1. Plant-growth regulant composition containing from 0.1 to 95% of a heterocyclic sulfonium salt of the formula

(I)

in which

R is methyl;

A^- is one equivalent of an anion of a chlorine or methyl sulfate; and

X is the group $N^+R'R''A^-$ in which

A^- is identified as above; and

R' and R", which may be identical or different, are each methyl; and at least one plant-growth regulatingly acceptable inert carrier.

4,047,924

REGULATING PLANT GROWTH

Keith Peter Parry, Maidenhead, and Edwin Francis George, Eversley, near Basingstoke, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 21, 1975, Ser. No. 634,181

Claims priority, application United Kingdom, Nov. 28, 1974, 51571/74

Int. Cl.² A01N 9/22

U.S. Cl. 71—76 **5 Claims**

1. A method of regulating the growth of, or killing, plants, which method consists essentially of applying to said plants an indole compound which is 7 - chloro - or bromo - indole, said compound being applied in an amount sufficient at least to stunt, or kill, said plants.

4,047,925

ALKANE DIOLS AS CHEMICAL PINCHING AGENTS

Sol J. Barer, Clark, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,893

Int. Cl.² A01N 9/24

U.S. Cl. 71—78 **9 Claims**

1. A method for the inhibition of suckering in growing plants susceptible thereto comprising the application of an amount of a composition comprising an active agent consisting essentially of an alkane diol having 2 to 6 carbon atoms inhibitory to the growth of meristematic tissue.

4,047,926

TREATMENT OF SUGARCANE WITH N-(PERFLUOROACYL)-N-PHOSPHONOMETHYL GLYCINE

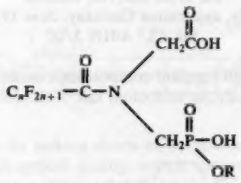
Melvin L. Rueppel, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 580,252, May 23, 1975, Pat. No. 3,970,695. This application May 3, 1976, Ser. No. 682,297

Int. Cl.² A01N 9/36

U.S. Cl. 71—86 **4 Claims**

1. A process for modifying the ripening of sugar cane plants so as to increase its yield of sucrose which comprises contacting the sugar cane with an effective amount of a compound of the formula



wherein R is a member of the group consisting of H and

and *n* is an integer of from 1 to 4.

4,047,927

N-(2-HYDROXYALKYL) DERIVATIVES OF N-PHOSPHONOMETHYLGLYCINE AND THE HERBICIDAL USE THEREOF

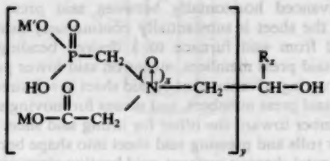
Van R. Gaertner, Ballwin, and Philip C. Hamm, Glendale, both of Mo., assignors to Monsanto Company, Saint Louis, Mo.

Filed Aug. 13, 1976, Ser. No. 714,054

Int. Cl.² A01N 9/36

U.S. Cl. 71—86 **7 Claims**

1. A herbicidal method which comprises contacting a plant with a herbicidally effective amount of a compound of the formula



wherein *x* is selected from zero and one, *y* is selected from one and two, *z* is selected from zero and one, the sum of $y + z$ is two, R is selected from hydrogen, methyl, ethyl, hydroxymethyl and lower alkoxymethyl, M is selected from hydrogen, lower alkyl and alkali metal, and M' is selected from hydrogen, lower alkyl, phenyl and alkali metal.

4,047,928

WILD OAT HERBICIDE MIXTURE

Richard P. M. Bond, Sittingbourne; Robert J. Pryce, Faversham; Clive A. Raven, Sittingbourne, and Michael A. J. Venis, Faversham, all of England, assignors to Shell Oil Company, Houston, Tex.

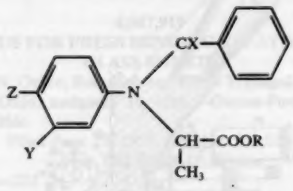
Filed June 21, 1976, Ser. No. 698,612

Claims priority, application United Kingdom, June 30, 1975, 27483/75

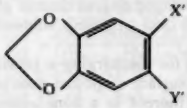
Int. Cl.² A01N 9/02

U.S. Cl. 71—88 **12 Claims**

1. A herbicidal composition comprising as active ingredient an N,N-disubstituted alanine derivative having the following general formula:



wherein Y and Z each represent, fluorine or chlorine, X is oxygen or sulfur; and R is hydrogen or an alkyl group containing up to 6 carbon atoms; and as a synergist therefor, a methylenedioxybenzene derivative having the following general formula:



wherein X' is a polyglycol ether group containing up to 20 carbon atoms and 2 to 6 oxygen-ether linkages and Y' is hydrogen or an alkyl group containing up to 6 carbon atoms, said alanine derivative and methylenedioxybenzene derivative

being present at a weight ratio of the alanine derivative to the methylenedioxybenzene derivative of from 10:1 to 1:10.

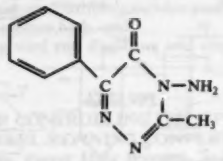
4,047,929

SYNERGISTIC HERBICIDAL COMPOSITIONS

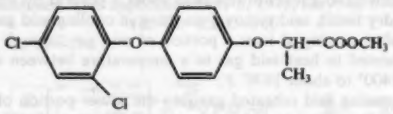
Robert R. Schmidt, Cologne; Ludwig Eue, Leverkusen, and Wilfried Draber, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 21, 1976, Ser. No. 707,456
Claims priority, application Germany, Aug. 21, 1975, 2537290
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—93 10 Claims

1. A herbicidal composition containing as active ingredients, in herbicidally effective amounts, (1) 3-methyl-4-amino-6-phenyl-1,2,4-triazin-5-one of the formula



and (2) a 4-phenoxy-phenoxy-alkanecarboxylic acid of the formula



wherein the weight ratio of compound (1) to compound (2) is from about 1:1 to about 2:1.

4,047,930

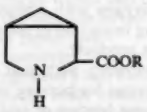
METHOD OF STERILIZING MALE ANTHERS

Michael W. Kerr, Borden, England, assignor to Shell Oil Company, Houston, Tex.

Filed Sept. 7, 1976, Ser. No. 721,001
Claims priority, application United Kingdom, Sept. 16, 1975, 38011/75
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—95 4 Claims

1. A method of sterilizing male anthers in plants which comprises treating the plants with an amount effective to sterilize said anthers of a heterocyclic compound having the following general formula:

(I)



wherein R represents a hydrogen atom, an alkali metal, an alkaline earth metal, ammonium, alkylammonium the alkyl groups or groups of which preferably each contain up to 6 carbon atoms, or an alkyl group of up to 4 carbon atoms.

4,047,931

PROCESS FOR THE CONTROL OF PLANT METABOLISM

Otto Rohr, Therwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 462,146, April 29, 1974, Pat. No. 3,944,411, which is a division of Ser. No. 239,328, March 29, 1972, Pat. No. 3,821,285. This application Dec. 8, 1975, Ser. No. 638,409
Claims priority, application Switzerland, Apr. 1, 1971, 4775/71
Int. Cl.[2] A01N 9/24
U.S. Cl. 71—107 1 Claim

1. A process for the promotion of fruit abscission which comprises applying to the fruit-bearing plant or to the fruit itself an effective, non-phytotoxic amount of 3-acetoxybenzoic acid -(2'-iodoethyl)-ester.

4,047,932

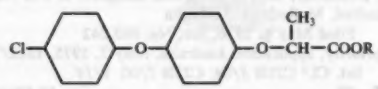
HERBICIDAL AGENTS

Konrad Albrecht, Fischbach, Taunus; Peter Langeluddeke, Diedenbergen, Taunus; Hans Schumacher, Weilbach, Taunus, and Friedhelm Schwerdtle, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 4, 1975, Ser. No. 583,514
Claims priority, application Germany, June 6, 1974, 2427270
Int. Cl.[2] A01N 9/20
U.S. Cl. 71—108 5 Claims

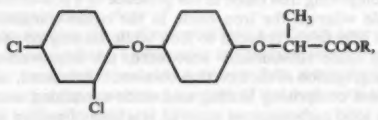
1. A herbicidal preparation comprising, as the active ingredient, a herbicidally effective amount of a mixture of 1.5 to 5 parts by weight of a compound selected from the group of compounds of the formulas

A



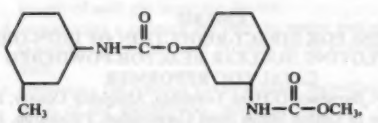
and

B



wherein R is hydrogen or alkyl having 1 to 6 carbon atoms, and 1 part by weight of 3-methoxy-carbonylaminophenyl-N-(3'-methylphenyl)-carbamate of the formula

C



in combination with formulation auxiliaries.

4,047,933

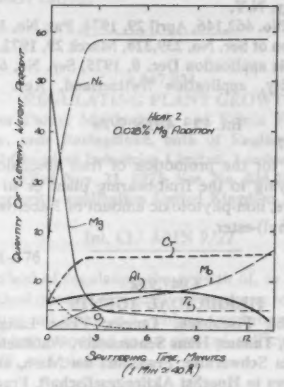
POROSITY REDUCTION IN INERT-GAS ATOMIZED POWDERS

Jay Michael Larson, Warwick; Ian Sidney Rex Clark, Greenwood Lake, both of N.Y., and Robert Cameron Gibson, Ringwood, N.J., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed June 3, 1976, Ser. No. 692,312
Int. Cl.[2] B22D 23/08
U.S. Cl. 75—.5 C 14 Claims

1. A process for substantially reducing gas entrapment in an

inert gas atomized metal powder comprising: melting a metal alloy, activating said metal alloy by addition of from about 0.001 to about 0.1% by weight of an activating agent, selected



from the group consisting of magnesium, calcium, lithium, silicon, and rare earths and atomizing said metal alloy containing said activating agent by contact with a high velocity inert gas.

4,047,934

BENEFICIATION OF THE NON-FERROUS METAL VALUES OF OXIDE-CONTAINING MATERIALS

Leslie John Pollard, Lower Templestowe, and Donald Fergusson Stewart, Doncaster, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed May 4, 1976, Ser. No. 683,242
Claims priority, application Australia, May 7, 1975, 1512/75
Int. Cl.[2] C21B *3/04;* C22B *7/00, 9/14*
U.S. Cl. 75—29 **10 Claims**

1. In a process of removing iron from an oxide containing material comprising iron oxide in the presence of a non-ferrous metal oxide wherein the iron oxide in the oxide containing material is selectively reduced to iron while leaving non-ferrous metal oxide substantially unreduced, the improvement whereby segregation of the iron thus obtained is enhanced, said improvement comprising heating said oxide-containing material with a solid carbonaceous material in a bath of molten salt to a temperature in the range from 750° to 1300° C, wherein said salt comprises at least one chloride selected from the group consisting of alkali metal chlorides and alkaline earth metal chlorides.

4,047,935

PROCESS FOR DIRECT-REDUCTION OF IRON-ORE EMPLOYING NUCLEAR REACTOR-POWDERED CATALYTIC REFORMER

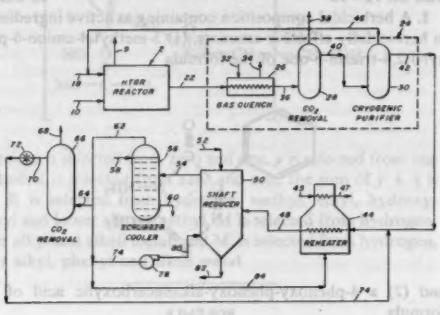
Thomas F. Barnhart, O'Hara Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 11, 1974, Ser. No. 531,829
Int. Cl.[2] C21B *13/00;* C07C *1/02*
U.S. Cl. 75—34 **14 Claims**

1. A process for the direct-reduction of iron ore, said process comprising:

a. passing iron-ore pellets or lump iron ore into the top of the shaft reducer;

b. producing a reducing gas for introduction into the lower half of said shaft reducer in counter current flow to the pellets, said reducing gas being produced from a fluid, selected from the group consisting of gaseous and light hydrocarbon liquids, which is passed to a catalytic reformer operated at a pressure of from about 200 to about 700 psig, said catalytic reformer being heated by indirect exchange through a reactant coolant loop connected to a high-temperature gas-cooled nuclear reactor operated at a pressure of about 200 to 700 psig and a corecoolant temperature of less than about 1650° F and having a reactant selected from the group consisting of H_2O, CO_2, and mixtures thereof, passed into said reformer in an amount sufficient to (i) react with the fluid to produce a product gas containing hydrogen and carbon monoxide in a sum of from about 50 to about 97 percent, and from about 5.5 to about 34 percent by volume (dry basis) of unreacted hydrocarbon and (ii) inhibit carbon deposition on the catalyst, collecting said gas produced from said reformer, removing a sufficient amount of unreacted hydrocarbon, carbon dioxide and H_2O to render the gas acceptable for direct-reduction, said unreacted hydrocarbon being removed to a level of less than about 5 percent by volume (dry basis), said removal resulting in cooling said gas;



c. then passing at least a portion of said gas through a reheated to heat said gas to a temperature between about 1400° to about 1800° F;

d. passing said reheated gas into the lower portion of said shaft reducer to reduce the oxygen content of said iron-ore pellets or said lump iron ore to produce iron pellets or sponge iron;

e. passing a cooling gas into said shaft near the bottom thereof to cool said reduced iron pellets or sponge iron prior to discharge from said shaft reducer; and

f. discharging said iron pellets or sponge iron from said shaft reducer.

4,047,936

PROCESS FOR REFINING HOT METAL TO STEEL

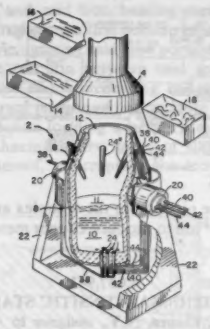
Yi-Chung Chang, Murrysville, Pa., assignor to Berry Metal Company, Harmony, Pa.

Division of Ser. No. 347,743, April 4, 1973, Pat. No. 3,912,243. This application July 25, 1975, Ser. No. 599,197
Int. Cl.[2] C21C *5/32, 5/30*
U.S. Cl. 75—52 **4 Claims**

1. The process of making steel in a bottom-blow converter which is provided in the top thereof with a burner lance supplying oxygen for heat of combustion in the top at the converter whereby the converter may be charged with pig iron and scrap, the steps of the process comprising:

1. charging of scrap through the top of the converter,
2. bottom blowing of oxygen with a shield gas over said scrap thereby oxidizing impurities in the vessel generating a combustible gaseous product,
3. simultaneously top blowing with said burner lance of oxygen into said converter for burning with said combustible gases for producing heating of said scrap to molten metal,
4. charging said molten metal with pig iron supplied to said converter,
5. continuing the bottom and top blowing of oxygen with the said blowing decarbonizing said molten bath,

6. charging of lime and other fluxes into said converter, said bottom blowing of said oxygen and top blowing combining with said combustible gases for producing heat at the top of the molten bath, and
7. discharging steel and slag from said converter.



4,047,937

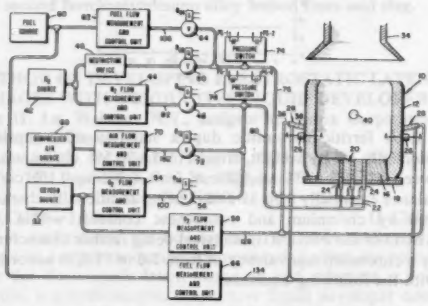
METHOD FOR CONTROLLING THE OPERATION OF A STEEL REFINING CONVERTER

William A. Kolb, Forest Hills Borough, and Pete Vignovich, Bethel Park Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 312,173, Dec. 4, 1972, Pat. No. 3,895,785, which is a continuation-in-part of Ser. No. 277,017, Aug. 1, 1972, abandoned. This application May 5, 1975, Ser. No. 574,838

Int. Cl.[2] C21C 7/00

U.S. Cl. 75—59 5 Claims



1. The method of operating a tiltable steel refining converter of the type having at least one tuyere therein positioned below the molten metal level in the converter, said tuyere consisting of a center jet positioned within an annulus jet, comprising the steps of
   a. tilting said converter onto its side,
   b. blowing first and second purging gases at a predetermined pressure through the center and annulus jets of said tuyere respectively,
   c. placing a charge within said converter,
   d. increasing the pressure of the purging gases being blown through said center jets,
   e. tilting said converter to an upright position,
   f. blowing oxygen and a fuel through said center and annulus jets respectively while continuing to blow said first and second purging gases through said jets,
   g. shutting off said first and second purging gases from the jets of said tuyere once the flow of oxygen and fuel has been established until the refining of said charge is completed,
   h. blowing said first and second purging gases through said center and annulus jets while continuing to blow oxygen and fuel through said center and annulus jets respectively,
   i. shutting off the oxygen and the fuel from the jets of said tuyere once the flow of said first and second purging gases has been established,
   j. tilting said converter to an approximately horizontal position,
   k. reducing the pressure of the purging gases being blown through said tuyere, and
   l. removing the refined steel from said converter.

4,047,938

PROCESS FOR REFINING MOLTEN METAL

Andrew Geza Szekely, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 536,954, Dec. 23, 1974, Pat. No. 3,980,742, which is a continuation-in-part of Ser. No. 323,785, Jan. 15, 1973, Pat. No. 3,870,511, which is a division of Ser. No. 211,950, Dec. 27, 1971, Pat. No. 3,743,263. This application June 18, 1976, Ser. No. 697,466

The portion of the term of this patent subsequent to Mar. 11, 1992, has been disclaimed.

Int. Cl.[2] C22B 45/00

U.S. Cl. 75—67 A 12 Claims

1. A process for refining a molten metal selected from the group consisting of magnesium, copper, zinc, tin and lead comprising the steps of:
   a. feeding the molten metal into a refining zone;
   b. maintaining a protective atmosphere above the surface of said molten metal at a greater than atmospheric pressure, thereby preventing contact of the melt with air or atmospheric moisture;
   c. providing a gas injection device submerged in said molten metal comprising (i) a shaft fixedly attached to a vaned rotor at its lower end, (ii) a stationary sleeve surrounding said shaft, and (iii) a passageway for conveying and discharging refining gas into the molten metal running the length of said gas injection device;
   d. introducing a refining gas into the upper end of said passageway under sufficient pressure to be injected into the melt;
   e. preheating the refining gas by contact thereof with the hot walls of the passageway, whereby the gas is expanded, before being sub-divided into gas bubbles, to the point where thermal growth of said bubbles in the melt is substantially prevented;
   f. directing the preheated refining gas to the vanes of said rotor of said gas injection device;
   g. sub-dividing the refining gas into discrete gas bubbles by rotating said vaned rotor at a speed sufficient to create a circulation pattern in the molten metal such that the gas bubbles are transported substantially radially outward with a downward component relative to their points of entry into the melt thereby coming into intimate contact with substantially the entire mass of molten metal in said refining zone, resulting in the removal of dissolved gases and substantially all non-metallic impurities from said melt;

h. withdrawing the spent inert gas and the dissolved gases released by the metal while collecting other non-metallic impurities in a slag layer on the surface of the molten metal; and

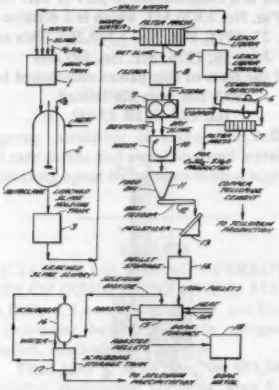
i. withdrawing the refined molten metal from said refining zone.

4,047,939

SLIMES TREATMENT PROCESS

Bernard H. Morrison, Mississauga, Canada, assignor to Noranda Mines Limited, Toronto, Canada

Filed June 13, 1975, Ser. No. 586,819
Int. Cl.[2] C22B *11/00*
U.S. Cl. 75—99 **11 Claims**



1. A method of treating slimes from the electrolytic refining of copper comprising:

a. leaching said slimes with dilute sulphuric acid under an oxygen partial pressure of up to 50 psi and at an elevated temperature between about 180° and 320° F until copper and tellurium in said slimes are substantially dissolved, thereby forming a leach slurry;

b. effecting a liquid-solid separation on said leach slurry to separate leach liquor from the solid leach slimes;

c. treating said leach liquor with metallic copper to cement the tellurium as copper telluride and form a remaining solution suitable for the production of copper sulphate; and

d. separating the cemented copper telluride solids from said solution.

4,047,940

SEPARATION AND RECOVERY OF COPPER METAL FROM AMMONIACAL SOLUTIONS

Alkis S. Rappas, Arlington, and J. Paul Pemsler, Lexington, both of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

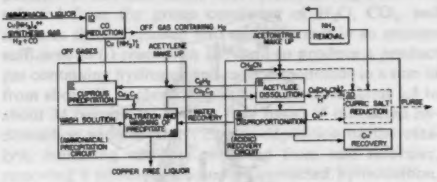
Filed June 14, 1976, Ser. No. 695,389
Int. Cl.[2] C22B *15/12*
U.S. Cl. 75—108 **32 Claims**

1. A process for producing copper metal from a solution containing Cu^+ ions comprising the steps of:

a. precipitating the Cu^+ ions from the solution as a cuprous acetylide;

b. separating the cuprous acetylide precipitate from the solution;

c. reacting the cuprous acetylide with an acid and a nitrile to form a soluble cuprous-nitrile complex;



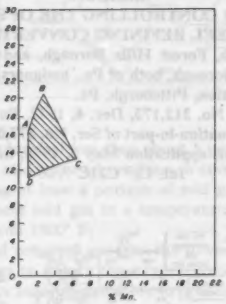
d. removing the nirile from the complex and disproportionating the Cu^+ ion to produce copper metal and Cu^{++} ions.

4,047,941

DUPLEX FERRITIC-MARTENSITIC STAINLESS STEEL

Roger N. Wright, Elnora, N.Y., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 508,376, Sept. 23, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,901
Int. Cl.[2] C22C *38/38*
U.S. Cl. 75—126 B **5 Claims**



1. A ferritic-martensitic duplex stainless steel consisting essentially of, by weight, from 11.0 to 20.5% chromium, between 2.0 and 6.5% manganese, from 0.005 to 0.1% carbon, balance essentially iron; said steel being additionally characterized by chromium and manganese contents within Area ABCD of the FIGURE; said steel being further characterized by a chromium equivalency of from 5.0 to 11.0, in accordance with the following equation:

$$\text{Chromium Equivalency} = \%Cr + 5(\%Si) + 4(\%Mo) + 12(\%Al) - 40(\%C + \%N) - 2(\%Mn) - 3(\%Ni) - \%Cu;$$

silicon, molybdenum, aluminum, nitrogen, nickel and copper being residuals, said steel having at least 5% ferrite and at least 20% martensite, said steel having an as-annealed tensile strength between 80 and 175 ksi and an as-annealed ductility between 18 and 25% elongation in 1 inch.

4,047,942

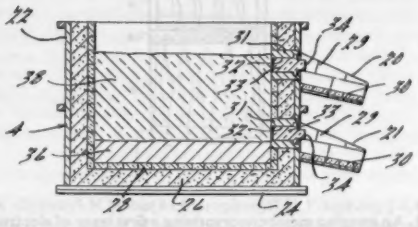
THERMITE SMELTING OF FERROMOLYBDENUM

George W. Clark, Stonham Aspal, and Douglas H. Dainty, Bury St. Edmunds, both of England, assignors to AMAX Inc., Greenwich, Conn.

Filed Sept. 29, 1976, Ser. No. 727,879
Int. Cl.[2] C22B *5/04*
U.S. Cl. 75—133.5 **10 Claims**

1. A process for producing ferromolybdenum by a thermite smelting reaction which comprises the steps of forming a substantially uniform particulated mixture of molybdenum

oxide, an iron bearing material, a reductant present in an amount substantially equal to the stoichiometric quantity required for reaction with the oxygen associated with said molybdenum oxide and said iron bearing material, and a slag fluxing agent, introducing a first portion of said mixture into a refractory crucible, igniting said first portion to effect an exothermic thermite reaction between said reductant and said molybdenum oxide and iron bearing material, progressively introducing a second portion of said mixture into said crucible to sustain said reaction forming a molten mass of said ferromolybdenum alloy having a first layer of slag floating on the upper surface thereof, interrupting the introduction of said



mixture for a period of time to permit the migration of molten droplets of said ferromolybdenum alloy from said first slag layer into said molten mass, cooling said molten mass to effect a solidification thereof forming a first ferromolybdenum alloy button, progressively introducing a third portion of said mixture into said crucible on the molten slag layer to reinitiate and sustain said thermite reaction forming a second molten mass of ferromolybdenum alloy having a second slag layer thereon, cooling the reaction mass to effect a solidification of said second molten mass to form a second ferromolybdenum alloy button and second slag layer thereon, and thereafer extracting the solidified said reaction masses and separating said first and said second ferromolybdenum alloy button from said slag.

4,047,943

METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER

Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 364,216, May 25, 1973, Pat. No. 3,907,694. This application Feb. 24, 1975, Ser. No. 552,590

Int. Cl.² G03G *13/10*

U.S. Cl. 96—1 LY **11 Claims**

1. A method for the development of latent electrostatic images on a substrate comprising positioning close, but spaced from the electrostatic latent image on said substrate, a non-volatile, non-hydroscopic, conductive liquid developer comprising about 5–25 weight percent of a coloring agent, about 1–10 weight percent of a dispersing agent, but 5–30 weight percent of a resin binder and the balance triethylene glycol monobutyl ether; and applying said non-volatile conductive liquid developer to said substrate from flow aiding elements in physical contact between said liquid developer and said substrate by applying a bias to said liquid developer whereby said liquid developer moves along the flow aiding elements and thereby develops said electrostatic latent image.

4,047,944

ELECTROPHORETIC MIGRATION IMAGING PROCESS WITH NEUTRAL DENSITY BISAZO PIGMENTS

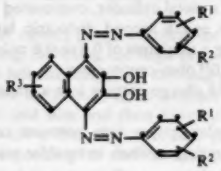
Louis J. Rossi, and Michael T. Regan, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 691,266, June 1, 1976, abandoned. This application Dec. 27, 1976, Ser. No. 755,368

Int. Cl.² G03Q *13/22*

U.S. Cl. 96—1.2 **7 Claims**

1. In an electrophoretic migration imaging process which comprises subjecting an electrically photosensitive colorant material positioned between at least two electrodes to an applied field and exposing said material to an image pattern of radiation to which the material is photosensitive, thereby obtaining image formation on at least one of said electrodes, the improvement which comprises using as at least a portion of said material a bisazo naphthalenediol pigment having the formula:



wherein:

R^1 is $-OCH_3$, $-OC_2H_5$ or $-OCH_2CONH_2$;

R^2 is H or $-NO_2$, and

R^3 is H or $-SO_2NH_2$.

4,047,945

XEROXPRINTING MASTER AND PROCESS

Gustav R. Pfister, Webster, and David J. Williams, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 18, 1975, Ser. No. 550,258

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1 R **5 Claims**

1. An electrophotographic imaging member consisting essentially of a conductive substrate, a non-persistent photoconductive insulating layer operatively associated with said conductive substrate, a persistent photoconductive insulating layer comprising an acid sensitized charge transfer complex contiguous with the non-persistent photoconductive insulating layer and an unpigmented dielectric film overcoating the free surface of the persistent photoconductive insulating layer.

4,047,946

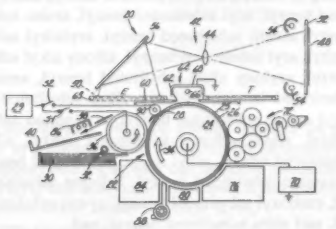
DUPLICATING PROCESS UTILIZING ION MODULATING MEANS AS THE IMAGE GENERATING SOURCE

George Thomas Croft, Northfield, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Division of Ser. No. 492,005, July 26, 1974, Pat. No. 3,957,365. This application Feb. 2, 1976, Ser. No. 654,611

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 R **5 Claims**



1. In a process for making reproductions of a graphic original on plain paper through the use of a foraminated image storing device in cooperation with an image generating medium, the steps comprising:

imparting a charge distribution system on the surface of said image storing device corresponding to the intelligence on

said graphic original, said charge distribution system causing said device to selectively transmit charged particles therethrough, directing charged particles against said image device;

collecting the charged particles transmitted through said device onto said image generating medium to form a charge pattern corresponding to the intelligence on said graphic original, said image generating medium being in the form of a metal cylinder, overcoated with a first compliant layer and a second dielectric layer, said second layer having a thickness of 0.4 to 0.6 mils and a resistivity of at least 10^{14} ohm-centimeters;

converting said charge pattern into a transferrable material image;

feeding said plain paper into pressure contact with said image generating medium to transfer said material image thereto.

4,047,947

PROCESS FOR PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENIUM COMPOUND IN A POLYMERIC MATRIX

Joseph Y. C. Chu, Fairport, and Wolfgang H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 23, 1974, Ser. No. 517,120

The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.

Int. Cl.[2] G03G *5/12, 13/24;* G03C *1/00*

U.S. Cl. 96—1.3 **15 Claims**

1. A process for preparation of transparencies comprising:

a. forming a photoconductive solid phase dispersion of particles of selenium in an insulating polymer matrix by subjecting an insulating film consisting essentially of an organo-selenium compound and an insulating polymer to sufficient electromagnetic and/or thermal energy to effect decomposition of the organo-selenium compound whereby particles of selenium are deposited within the insulating film in substantial conformance with the distribution of the electromagnetic and/or thermal energy throughout the film, the organo-selenium compounds of this film being represented by the formula

$$R-(Se)_n-R_1$$

wherein:

R and R_1 are independently selected from the group consisting of benzyl, alkyl substituted benzyl, alkoxy substituted benzyl, acyl substituted benzyl, amino substituted benzyl, amido substituted benzyl, arylalkyl substituted benzyl, aryl substituted benzyl, alkoxy alkyl substituted benzyl, aryloxy alkyl substituted benzyl, amino alkyl substituted benzyl, hydroxy alkyl substituted benzyl, alkyl amino substituted benzyl, aryl amino substituted benzyl, alkyl carbonyl substituted benzyl, alkyl thio substituted benzyl, alkyl seleno substituted benzyl, carboxamido substituted benzyl, halogen substituted benzyl, carboxyl substituted benzyl, cyano substituted benzyl, and nitro substituted benzyl; and

n is 1 to 4.

b. forming a latent electrostatic image on the surface of said insulating film;

c. developing the latent image by bringing said latent image in contact with oppositely charged developer materials; and

d. affixing of the developer materials to the insulating polymeric film.

4,047,948

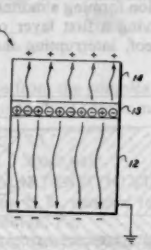
COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY

Anthony M. Horgan, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

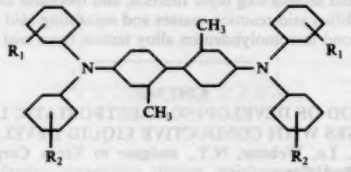
Filed Nov. 1, 1976, Ser. No. 737,448

Int. Cl.[2] G03G *5/00, 5/04*

U.S. Cl. 96—1.5 R **36 Claims**



1. An imaging member comprising a first layer of electrically active charge-transport material contained on a supporting substrate, a photoconductive layer overlying said active layer, and a second layer of electrically active charge transport material overlying said photoconductive layer, said photoconductive layer exhibiting the capability of photo-generation of charge carriers and injection of said charge carriers, one of said electrically active layers comprising electrically inactive resinous material having dispersed therein from about 10 to about 75 percent by weight of:



wherein R_1 is selected from the group consisting of hydrogen, (ortho) CH_3, (meta) CH_3 and (para) CH_3, and R_2 is selected from the group consisting of (ortho) CH_3, (meta) CH_3 and (para) CH_3, and capable of supporting the injection of photogenerated holes from said photoconductive layer and transporting said holes through said electrically active layer and the other electrically active layer capable of supporting the injection of photogenerated electrons from said photoconductive layer and transporting said electrons through said electrically active layer.

4,047,949

COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY

Anthony M. Horgan, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

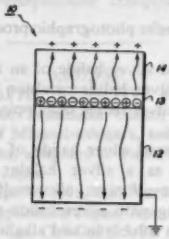
Filed Nov. 1, 1976, Ser. No. 737,292

Int. Cl.[2] G03G *5/00, 5/04*

U.S. Cl. 96—1.5 R **32 Claims**

1. An imaging member comprising a first layer of electrically active charge-transport material contained on a supporting substrate, a photoconductive layer overlying said active layer, and a second layer of electrically active charge transport material overlying said photoconductive layer, said photoconductive layer exhibiting the capability of photo-generation of charge carriers and injection of said charge carriers, one of said electrically active layers comprising electrically inactive resinous material having dispersed therein from about 10 to about

75 percent by weight of a material selected from the group consisting of N,N'-diphenyl-N,N'-bis(2-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine; N,N'-bis(3-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine; N,N'-diphenyl-N,N'-bis(4-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine; N,N'-diphenyl-N,N'-bis(2-chlorophenyl)-[1,1'-biphenyl]-4,4'-diamine; N,N'-diphenyl-N,N'-bis(3-chlorophenyl)-[1,1'-biphenyl]-4,4'-diamine and



N,N'-diphenyl-N,N'-bis(4-chlorophenyl)-[1,1'-biphenyl]-4,4'-diamine, and capable of supporting the injection of photogenerated holes from said photoconductive layer and transporting said holes through said electrically active layer and the other electrically active layer capable of supporting the injection of photogenerated electrons from said photoconductive layer and transporting said electrons through said electrically active layer.

4,047,950

METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON AN ELECTROPHOTOGRAPHIC FILM

Frank C. Gross, Wilbraham, Mass., assignor to A. B. Dick/-Scott, Holyoke, Mass.

Division of Ser. No. 459,195, April 8, 1974, Pat. No. 3,916,828, which is a continuation-in-part of Ser. No. 349,452, April 9, 1973, Pat. No. 3,972,610. This application Aug. 18, 1975, Ser. No. 605,392
Int. Cl.² B05B 5/02
U.S. Cl. 96—1 SD 3 Claims

1. Method of developing an electrostatic latent image on a portion of an electrophotographic film, comprising the steps of:

A. positioning the film against a mask bordering an opening in a developing chamber with the mask bordering the portion of the film being developed and forming a seal against fluid flow;

B. drawing toner liquid through the chamber and into contact with the portion of the film with a vacuum source which creates a sub-atmospheric pressure within the chamber to prevent leakage of the toner liquid from the mask beyond the portion of the film being developed; and

C. after step B, drawing drying air through the chamber with a vacuum source which creates a sub-atmospheric pressure within the chamber to prevent toner liquid from leaking past the mask beyond the portion of the film during drying.

4,047,951

MARKER MAKING METHODS FOR CUTTING FABRIC PATTERNS

Shannon L. Cooper, Chicago, Ill., and Frank C. Adams, Cape Girardeau, Mo., assignors to Hart Schaffner & Marx, Chicago, Ill.

Continuation-in-part of Ser. No. 488,475, July 15, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,711
Int. Cl.² G03C 5/04
U.S. Cl. 96—27 R 15 Claims

1. A method of cutting pieces of fabric for use in the manufacture of clothing, including the steps of:

reproducing a full size image of a clothing pattern on a light sensitive film by photographic contact printing of said pattern and said film and then developing said exposed film to provide a film replica of said pattern having an image corresponding to that of said pattern with said image being at least partially surrounded by a border,

positioning a plurality of said film replicas on a light sensitive marker sheet with said images arranged on said marker sheet so as to provide the most efficient utilization of the fabric to be cut using said marker sheet,

exposing said film replicas and said light sensitive marker sheet to a source of light,

developing said exposed light sensitive marker sheet to provide a marker sheet having a plurality of closely spaced marker images thereon, and

placing said marker sheet on a lay of fabric and cutting said lay of fabric into pieces of fabric by cutting along the outlines of the marker images on said marker sheet.

4,047,952

IMAGEWISE SOLUBLE SILVER SALT INTENSIFICATION OF DIFFUSION TRANSFER SILVER IMAGES

Maurice Edgar Pfaff, Le Perreux, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,932
Claims priority, application France, May 2, 1975, 75.13773
Int. Cl.² G03C 5/54, 7/00, 1/48, 1/40
U.S. Cl. 96—29 R 24 Claims

1. A photographic diffusion transfer process for producing an image in a photographic element, said element comprising

1. a support bearing at least one negative silver halide emulsion layer and a physical development associated with said negative silver halide emulsion layer,

said process comprising

a. image-wise exposing said negative emulsion layer and

b. developing said negative emulsion layer with a chemical developer in the presence of a silver halide solvent and an alkaline activator which contains therein a soluble, reducible silver salt, said development performed such that the silver halide solvent and alkaline activator first contacts said negative emulsion layer and then contacts said physical development layer, whereby

physical development of a positive silver image corresponding to the unexposed areas of said negative emulsion layer is produced in said physical development layer.

4,047,953

COLOR DIFFUSION TRANSFER EMPLOYING SILVER SALT TRANSFER REVERSAL AND 4-THIOHYDANTOINE

Maurice Edgar Pfaff, Le Perreux, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 28, 1976, Ser. No. 680,950

Claims priority, application France, May 2, 1975, 75.13774

Int. Cl.[2] G03C *5/54, 7/00, 1/48, 1/40*

U.S. Cl. 96—29 D **15 Claims**

13. In a photographic diffusion transfer process for producing a dye or dye precursor image in a photographic element and transferring said image to an image receiving layer, said element including a support bearing at least one element comprising

1. a negative silver halide emulsion layer having associated therewith a ballasted scavenger for oxidized chemical developing agent and
2. a physical development layer comprising cadmium sulfide nuclei and an initially immobile dye-providing substance which provides diffusible dye or dye precursor,

said process including

a. image-wise exposing said negative emulsion layer

b. developing said negative emulsion layer with a chemical developing agent in the presence of an alkaline processing medium and a silver halide solvent, whereby unexposed silver halide in said negative emulsion is solubilized and diffuses into said physical development layer,

c. physically developing said solubilized silver halide in said physical development layer in the presence of a chemical developing agent to obtain oxidized chemical developer which interacts with said initially immobile dye providing substance thereby producing a diffusible dye or dye precursor image, and

d. transferring said diffusible dye or dye precursor image to said image receiving layer,

the improvement which comprises carrying out step (b) of said process in the presence of a 4-thiohydantoine.

4,047,954

SULFINYL-SULFONYL ALKANE SILVER HALIDE SOLVENTS

Richard B. Greenwald, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 564,164, April 1, 1975, abandoned. This application July 19, 1976, Ser. No. 706,461

Int. Cl.[2] G03C *5/54, 5/38, 1/48, 1/06*

U.S. Cl. 96—29 R **29 Claims**

14. A diffusion transfer photographic process comprising the steps of:

1. reacting exposed silver halide of an imagewise exposed photosensitive silver halide emulsion layer carried on a support with a silver halide developing agent in aqueous alkaline solution;
2. reacting unreduced silver halide of said photosensitive emulsion with as a silver halide solvent an open-chain alkane possessing an intralinear sulfonyl group and an intralinear sulfinyl group wherein said sulfonyl and sulfinyl groups are separated by a single carbon atom substituted with two hydrogen atoms or with one hydrogen atom and one lower alkyl group to form a complex silver salt that is soluble in said alkaline solution;
3. transferring said complex silver salt to a superposed image-receiving layer; and
4. reducing said transferred complex silver salt to provide a silver image.

4,047,955

(DIALKYLAMINO)ALKYLOXOSULFONIUM ALKANESULFONYLMETHYLIDE SILVER HALIDE SOLVENT

Richard B. Greenwald, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 564,165, April 1, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,888

Int. Cl.[2] G03C *5/54, 5/38, 1/48, 1/06*

U.S. Cl. 96—29 R **28 Claims**

14. A diffusion transfer photographic process comprising the steps of:

1. reacting exposed silver halide of an imagewise exposed photosensitive silver halide emulsion layer carried on a support with a silver halide developing agent in aqueous alkaline solution;
2. reacting unreduced silver halide of said photosensitive emulsion with as a silver halide solvent, a (dialkylamino)alkyloxosulfonium alkanesulfonylmethylide capable of reacting with silver halide to form a complex silver salt that is soluble in said alkaline solution;
3. transferring said complex silver salt to a superposed image-receiving layer; and
4. reducing said transferred complex silver salt to provide a silver image.

4,047,956

LOW COATING WEIGHT SILVER HALIDE ELEMENT AND PROCESS

Ralph Kingsley Blake, deceased, late of Westfield, N.J., by June Arlene Blake, executrix, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 17, 1975, Ser. No. 632,728

Int. Cl.[2] G03C *5/32, 1/76, 1/06*

U.S. Cl. 96—60 R **15 Claims**

1. A process of forming a composite image in a photosensitive element that comprises a support, a photosensitive silver halide emulsion layer on said support, and a contiguous colorant-containing layer in which the colorant is selected from the group consisting of an oxidatively bleachable dye, fogged silver halide, colloidal silver, colloidal mercury, colloidal palladium, colloidal copper, a copper film, and a lead film; which process comprises:

1. imagewise exposing said photosensitive silver halide emulsion layer to actinic radiation, and developing the resultant latent image, and
2. immersing said photosensitive element in an oxidizing bleach bath which diffuses through the unexposed areas so as to chemically bleach those areas of the colorant-containing layer which are under the nonimage areas of the silver halide emulsion layer, leaving an image in those areas of the colorant-containing layer which are directly under the image formed in the silver halide emulsion layer, whereby the image in the silver halide emulsion layer is retained, and at the same time is intensified by the image in the colorant-containing layer.

4,047,957

PROCESS OF HARDENING PROTEIN-CONTAINING PHOTOGRAPHIC LAYERS WITH A MIXTURE OF A CARBOXYL GROUP-ACTIVATING, LOW MOLECULAR WEIGHT COMPOUND AND A CARBOXYL GROUP-ACTIVATING POLYMER

Walter Frans De Winter, 's-Gravenwezel, and Daniel Maurice Timmerman, Mortsel, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Feb. 6, 1976, Ser. No. 655,878

Claims priority, application United Kingdom, Feb. 10, 1975, 5653/75

Int. Cl.[2] G03C *1/76, 1/30*

U.S. Cl. 96—67 **11 Claims**

10. A silver halide photographic material containing at least

one protein-containing layer and a superposed contacting layer comprising a mixture of a low molecular weight, fast-acting, carboxyl group-activating hardening agent with a larger amount of a film-forming, hydrophilic, polymeric, fast-acting hardening agent carrying at least one carboxyl group-activating carbodiimide substituent, said low molecular weight hardening agent being selected from the group consisting of carbamoylpyridinium salts, carbamoyloxypyridinium salts, isoxazolium salts, dihydroquinoline compounds, and carbodiimides.

4,047,958

PHOTOGRAPHIC SENSITIVE MATERIALS

Masakazu Yoneyama; Toshimasa Usami; Shiyoichi Ino; Yoshiteru Sata, all of Minami-ashigara, and Nobuo Yamamoto, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 7, 1976, Ser. No. 674,538

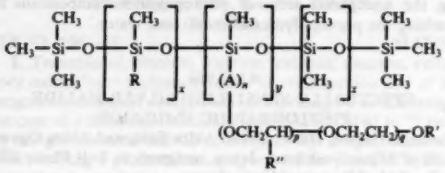
Claims priority, application Japan, Apr. 7, 1975, 50-42065

Int. Cl.[2] G03C *1/34*

U.S. Cl. 96—87 R **21 Claims**

1. A photographic sensitive material comprising a support having thereon at least one silver halide photographic emulsion layer, wherein at least one surface layer of the photographic sensitive material contains an alkylpolysiloxane having in the side chain thereof a polyoxyethylene chain, said alkylpolysiloxane being represented by the following general formula (I):

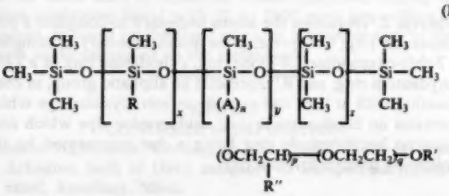
(I)



in which R represents an aliphatic group or aryl group, R′ represents a hydrogen atom, an aliphatic or an aryl group, R″ represents an alkyl group or alkoxyalkyl group, A represents a divalent residue of an aliphatic hydrocarbon, *n* represents 0 or an integer of 1 to 12, *p* represents a value of 0 to 50, *q* represents a value of 2 to 50, *x* represents a value of 0 to 100, *y* represents a value of 1 to 50, *z* represents a value of 0 to 100 and $x + y + z$ represents a value of 5 to 250.

3. A method of preventing fog which comprises incorporating in at least one surface layer of a photographic sensitive material, said photographic sensitive having thereon at least one silver halide photographic emulsion layer, a compound represented by general formula (I):

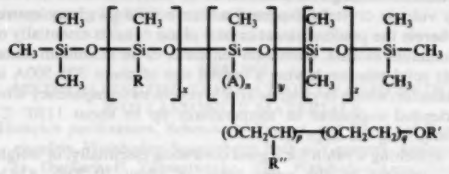
(I)



in which R represents an aliphatic group or aryl group, R′ represents a hydrogen atom, an aliphatic group or an aryl group, R″ represents an alkyl group or alkoxyalkyl group, A represents a divalent residue of an aliphatic hydrocarbon, *n* represents 0 or integer of 1 to 12, *p* represents a value of 0 to 50, represents a value of 2 to 50, *x* represents a value of 0 to 100, *y* represents a value of 1 to 50, *z* represents a value of 0 to 100 and $x + y + z$ represents a value of 5 to 250.

5. A method of preventing abnormal coloration which comprises incorporating in at least one surface layer of a photographic sensitive material, said photographic sensitive material having thereon at least one silver halide photographic emulsion layer, a compound represented by general formula (I):

(I)



in which R represents an aliphatic group or aryl group, R′ represents a hydrogen atom, an aliphatic group or an aryl group, R″ represents an alkyl group or alkoxyalkyl group, A represents a divalent residue of an aliphatic hydrocarbon, *n* represents 0 or integer of 1 to 12, *p* represents a value of 0 to 50, *q* represents a value of 2 to 50, *x* represents a value of 0 to 100, *y* represents value of 1 to 50, *z* represents a value of 0 to 100 and $x + y + z$ represents a value of 5 to 250.

4,047,959

NONIONIC WATER EMULSIONS OF TRIS(2,3-DIBROMOPROPYL)PHOSPHATE

George Paul Guzzardo, Norristown, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Feb. 9, 1976, Ser. No. 656,564

Int. Cl.[2] C09D *5/18, 5/20*

U.S. Cl. 106—2 **9 Claims**

1. The textile flame retardant emulsion consisting essentially of:

tris(2,3-dibromopropyl) phosphate — about 40 to 50%, one or more ketones selected from the group consisting of C_5 to C_7 aliphatic and alicyclic ketones - about 6 to 12%, and about 3 to 6% of one or more nonionic surfactants having a hydrophile-lipophile balance of 10 to 14 selected from the group consisting of:

a. sorbitan fatty acid esters and ethoxylated sorbitan fatty acid esters in which the ethylene oxide content ranges from about 4 to 20 moles and the fatty acids range from about C_{12} to C_{15},

b. polyoxyethylene glycol tallate in which the ethylene oxide content ranges from about 4 to 20 moles, and

c. ethoxylated condensate of ethylene glycol and propylene oxide in which the ethylene oxide content ranges from about 4 to 20 moles and the molecular weight ranges from about 1100 to 15,000.

and water to make 100%, all percentages being by weight.

8. The process of rendering textiles flame retardant and oil-water repellent with a hydrostatic pressure rating of at least 24 cm. by treating textiles with the composition consisting essentially of tris (2,3-dibromopropyl) phosphate emulsion of claim **1** in about 40–70 percent, anionic, cationic and nonionic fluorochemical oil and water repellent in about 10–20 percent, ammonium dihydrogen phosphate in about 2.5–4.0 percent, and water to make up 100 percent, all percentages being by weight, and thereafter, drying to textiles to leave about 10 to 30 percent tris (2,3 -dibromopropyl) phosphate and about 1 to 5 percent anionic, cationic or nonionic fluorochemical oil and water repellent on the textiles, all percentages based on the dry weight of the textiles.

4,047,960

REFRACTORY PARTIALLY CRYSTALLINE MATERIALS WITH GOOD VISIBLE TRANSPARENCY

Richard F. Reade, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 18, 1976, Ser. No. 697,315
Int. Cl.[2] C03C 3/22; C03B 32/00
U.S. Cl. 106—39.8 3 Claims

1. A method for making a transparent partially crystalline article containing at least about 20%, but less than about 50%, by volume crystals dispersed within a residual glassy matrix wherein the predomininant crystal phase consists essentially of aluminum niobate, aluminum tantalate, or an aluminum-tantalate solid solution having a crystal size of about 300–500A in diameter, which crystalline article retains its transparency after extended exposures to temperatures up to about 1150° C., comprising the steps of:

a. melting a batch for a glass consisting essentially, in weight percent on the oxide basis, of about 10–20% Al_2O_3, 59–72% SiO_2, 5–8% TiO_2, and 5–20% Nb_2O_5 and/or Ta_2O_5 0 to about 2% K_2O and/or 0 to about 6% Cs_2O;

b. simultaneously cooling said melt to a temperature at least within the transformation range and shaping a glass article of a desired configuration therefrom;

c. heating said glass article to a temperature of at least about 1000° C., but not more than about 1150° C., for a period of time sufficient to cause the crystallization of aluminum niobate, aluminum tantalate, and/or an aluminum niobate-tantalate solid solution having a crystal size of about 300–500A to occur in situ to produce a transparent partially crystalline article; and then

d. cooling said crystallized article to room temperature.

3. A transparent partially crystalline article made in accordance with claim 1.

4,047,961

CEMENT COMPOSITION

William Eugene Alderete, Irving; John Parke Boyer, Dallas; Kenneth Earl Daugherty, Lewisville, and David Lee Johnson, Garland, all of Tex., assignors to General Portland, Inc., Dallas, Tex.

Filed June 10, 1975, Ser. No. 585,659
Int. Cl.[2] C04B 7/14
U.S. Cl. 106—89 13 Claims

1. An efficacious cement consisting essentially of the grind obtained from the mixture of 1 up to 25 parts by weight of air-cooled iron blast furnace slag, and

from over 75 up to 99 parts by weight of conventional Type I Portland clinker, and

from 2 to about 10 parts by weight of set control additive.

4,047,962

CONSTRUCTION COMPOSITION

William Leo Copeland, Shreveport, La., assignor to Copeland Concrete Products, Inc., Monroe, La.

Continuation-in-part of Ser. No. 238,659, March 27, 1972, Pat. No. 3,827,895. This application May 28, 1974, Ser. No. 474,100
The portion of the term of this patent subsequent to Aug. 6, 1991, has been disclaimed.
Int. Cl.[2] C04B 7/02
U.S. Cl. 106—90 10 Claims

1. A composition, which upon mixing with water and subsequent setting forms a material of construction, consisting essentially of:

a. gypsum in a volume percentage of from about 15% to about 40%;

b. an expanded material in a volume percentage of from about 9% to about 29%;

c. cement in a volume percentage of from about 15% to about 40%; and

d. polypropylene or fiberglass or sisal fibers in a volume percentage of from about 1% to about 2%.

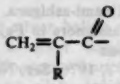
4,047,963

PHOTOPOLYMER COMPOSITIONS

David A. Simpson, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed June 17, 1976, Ser. No. 697,072
Int. Cl.[2] G03C 1/68
U.S. Cl. 96—115 R 22 Claims

1. A photopolymer composition comprising (1) a water-soluble, thermoplastic ethylene oxide copolymer containing 50–96% ethylene oxide, having a reduced specific viscosity of 0.4 to 50 at 1% concentration in water at 25° C., (2) from about 0.5 to about 25% by weight based on the ethylene oxide copolymer of an ethylenically unsaturated monomer having its unsaturation in the form of at least two



groups, wherein R is hydrogen or a C_1–C_3 alkyl group, and (3) from about 0.1 to about 10% by weighht based on the ethylene oxide copolymer of a photoinitiator thermally stable at temperatures up to about 150° C.

19. The process of making a printing relief which comprises admixing the components of the composition of claim 1, thermoforming the resulting mixture in the form of a sheet, laminating the sheet to a support to form a photopolymer element, exposing to actinic light selected areas of said element until substantial crosslinking takes place in the exposed areas without significant crosslinking in the unexposed areas, and removing the unexposed areas of photopolymer composition by washing the photopolymer element with water.

4,047,964

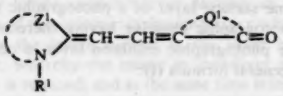
SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

Masanao Hinata; Haruo Takei; Akira Sato, and Akira Ogawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 23, 1975, Ser. No. 625,356
Claims priority, application Japan, Oct. 23, 1974, 49-122679
Int. Cl.[2] G03C 1/08, 1/14
U.S. Cl. 96—126 31 Claims

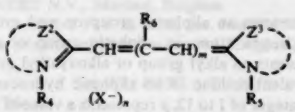
1. A spectrally sensitized silver halide photographic emulsion containing a supersensitizing amount of a dye combination comprising at least one dye represented by the following general formula (I):

(I)



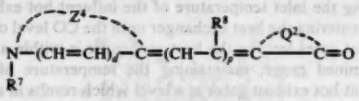
wherein Z^1 represents the atoms necessary to complete a benzisoxazole ring; Q^1 represents the atoms necessary to complete a 2-thio-oxazolidine-2,4-dione ring, a rhodanine ring or a 2-thiohydantoin ring; and R^1 represents an aliphatic group, in combination with at least one cyanine or merocyanine dye which contains no benzisoxazole ring, said cyanine dye which contains no benzisoxazole ring being a dye represented by the following general formula (II):

(II)



wherein Z^2 and Z^3 each represents the stoms necessary to complete an imidazole ring, an oxazole ring, a thiazole ring, a selenazole ring, a thiazoline ring, a quinoline ring or an indolenine ring; R^4 and R^5 each represents an aliphatic group; R^6 represents a hydrogen atom, an alkyl group, an aralkyl group or an aryl group; *m* represents 0 or 1; X represents an acid anion; and *n* represents 1 or 2; said merocyanine dye which contains no benzisoxazole ring being a dye represented by the following general formula (III):

(III)



wherein Z^4 represents the atoms necessary to complete an oxazole ring, a thiazole ring, a selenazole ring, a thiazoline ring, an imidazole ring, a 2-quinoline ring, a 4-quinoline ring, a pyridine ring, a pyrroline ring, or a tetrazole ring; Q^2 represents the atoms necessary to complete a 2-thio-oxazolidine-2,4-dione ring, a rhodanine ring or a 2-thiohydantoin ring; R^7 represents an aliphatic group; R^8 represents a hydrogen atom, an alkyl group or an aryl group; and *p* and *d* each represents 0 or 1.

4,047,965

NON-FRANGIBLE ALUMINA-SILICA FIBERS

Karl A. Karst, St. Paul, and Harold G. Sowman, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 4, 1976, Ser. No. 683,183
Int. Cl.² C04B *35/80*
U.S. Cl. 106—65 **23 Claims**

1. Transparent, smooth, fracture resistant, discrete, refractory oxide fibers uniformly round in cross section and of homogenous chemical composition comprising 96 to 100 weight percent of a mixture or chemical combination of 67 to 77 parts by weight alumina and 23 to 33 parts by weight silica, and fibers having a predominant polycrystalline phase of mullite, transitional alumina, or a mixture of both.

4,047,966

METHOD OF ENHANCING THE REFRACTORINESS OF HIGH PURITY FUSED SILICA

Peter P. Bihuniak, Corning, and Donald L. Guile, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,460
Int. Cl.² C04B *35/14*
U.S. Cl. 106—69 **13 Claims**

1. In an improved method of producing a high purity fused silica product, wherein a liquid flowable form of a silica slurry or sol is dried to form solid silica bodies which are then thermally vitrified, the improvement, whereby the refractoriness of the fused silica is enhanced, which comprises doping the silica containing liquid with 10 to 1000 parts per million by weight, as based on the fused silica, of aluminum and/or titanium oxide calculated on the metal basis.

4,047,967

CONCRETE COMPOSITION

Kamran Majidzadeh, Worthington, and Hani R. Guirguis, Upper Arlington, both of Ohio, assignors to Dampocrete Incorporated, Amesbury, Mass.

Continuation-in-part of Ser. No. 648,482, Jan. 12, 1976, abandoned, which is a continuation of Ser. No. 502,221, Aug. 30, 1974, abandoned. This application Feb. 16, 1977, Ser. No. 769,327
Int. Cl.² C04B *7/35*
U.S. Cl. 106—90 **45 Claims**

1. A curable composition suitable for forming concrete having a high damping capacity which comprises sand, gravel, cement, vegetable gum particles coated with a water dispersible curable resin and a curing agent for said resin, said coated vegetable gum particles being present in a concentration of between about 2 and 15 weight percent based upon the total weight of the concrete composition and water in a concentration to yield a water-cement ratio of between about 0.37 and 0.45, the relative concentration of resin and curing agent being controlled to cause substantially complete curing of the resin within about the same time necessary to cause substantially complete curing of the cement composition.

4,047,968

METHOD FOR THE PRODUCTION OF SYNTHETIC WOLLASTONITE MATERIALS

Heinrich zurStrassen, Schonberg, Taunus, and Eberhard Rauschenfels, Weisbaden-Sonnenberg, both of Germany, assignors to Dyckerhoff Zementwerke AG, Weisbaden-Amoneburg, Germany

Division of Ser. No. 241,823, April 6, 1972. This application Aug. 19, 1974, Ser. No. 498,641
Claims priority, application Germany, Apr. 7, 1971, 2116968
Int. Cl.² C08L *95/00*; C04B *35/16*
U.S. Cl. 106—281 R **9 Claims**

1. The method of producing steam hardened calcium silicate building materials, comprising

steam hardening a synthetic wollastonite material,

said wollastonite having been produced prior to its said steam hardening by a process which includes the steps of quenching in water the slag melt obtained during the thermal production of phosphorous from crude phosphate, and then burning the quenched melt in the substantial absence of phosphate slime in a rotary kiln at a temperature of about 1100° C in an oxidizing atmosphere for a period of time sufficient to produce a clear change in color.

4,047,969

IRON BLUE NACREOUS COATED PIGMENTS

Louis Armanini, Pleasantville, and Cordell E. Johnson, Peekskill, both of N.Y., assignors to The Mearl Corporation, Ossining, N.Y.

Filed Oct. 5, 1976, Ser. No. 729,787
Int. Cl.² C09C *1/00*
U.S. Cl. 106—291 **10 Claims**

1. A method for directly adhering Iron Blue to a mica or metal oxide coated mica substrate which comprises mixing said substrate with a soluble ferrocyanide and a soluble ferric compound in an aqueous medium such that there is at least 30% excess ferric ions based on the amount of ferric ion necessary to form Iron Blue, adjusting the pH to 3.5 to 5.5, recovering the resulting Iron Blue coated substrate and drying the recovered Iron Blue coated substrate at a temperature below the decomposition temperature of the Iron Blue.

4,047,970

PRODUCTION OF CALCINED CERAMIC PIGMENTS

Harry Augustus Morriss, Wombourne, and John Peter Hugh Williamson, Chester, both of England, assignors to Keeling and Walker, Limited, Stoke-on-Trent, England

Continuation-in-part of Ser. No. 544,452, Jan. 27, 1975, abandoned. This application Aug. 5, 1976, Ser. No. 711,935
Int. Cl.² C09C *1/00*
U.S. Cl. 106—299 **22 Claims**

1. In the process for the production of a zircon based stain by reacting a zirconia containing material with a color determining agent the improvement comprising the steps of:

1. plasma dissociating a zircon sand to obtain a plasma-dissociated zircon sand having zirconia rich phase, a silica rich phase and no more than 30% unreacted zircon sand;
2. comminuting said plasma dissociated zircon sand without

prior leaching to obtain a comminuted plasma dissociated zircon sand containing at least 90% by weight of its original silica content before comminution; and

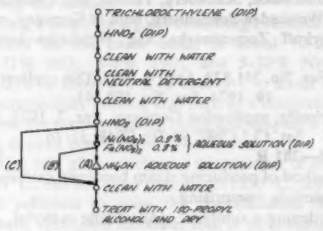
3. reacting said comminuted plasma dissociated zircon sand with a color determing agent.

4,047,971

METHOD FOR TREATING A GLASS SURFACE

Hiroaki Yanagida, Kashiwa, and Tsuneo Ohashi, Katsuta, both of Japan, assignors to Fujitok Co., Ltd., Tokyo, Japan

Filed Apr. 8, 1976, Ser. No. 674,879
Claims priority, application Japan, May 2, 1975, 50-53528
Int. Cl.[2] B08B 3/00; C03C 17/22, 21/00
U.S. Cl. 134—2 **6 Claims**



1. A method for treating a solid alkali glass surface to prevent whitening thereof comprising the steps of:

pre-cleaning said glass surface;

bringing said pre-cleaned glass surface to contact with an aqueous solution containing one or more metal nitrates selected from the group consisting of nitrates of iron, nickel, chromium and cobalt in amounts effective to prevent whitening of said glass surface; and

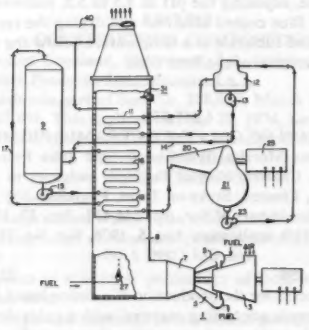
immediately thereafter post-cleaning said metal nitrate treated glass surface.

4,047,972

METHOD FOR THERMALLY DE-SOOTING HEAT TRANSFER SURFACES

James P. Stumbar, Middletown Township, Allegheny County; Daniel E. Carl, Media, and Suh Y. Lee, Monroeville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1976, Ser. No. 726,038
Int. Cl.[2] C03C 23/00; B08B 7/00
U.S. Cl. 134—2 **6 Claims**



1. A method for removing carbonaceous deposits which form on the outside of heat exchanger tubes disposed to extract heat from hot exhaust gases from a fossil fuel energy system, said method of removing carbonaceous deposits comprising the steps of:

shutting down the system;

draining water from the heat exchanger tubes;

blanketing the inside of the heat exchanger tubes with an inert gas;

starting up the energy system and stabilizing its operation at a minimum temperature;

maintaining a predetermined CO level of the effluent hot exhaust gases leaving the heat exchangers;

increasing the inlet temperature of the influent hot exhaust gases entering the heat exchanger until the CO level of the effluent gases leaving the heat exchanger is within a predetermined range, maintaining the temperature of the influent hot exhaust gases at a level which results in a CO level in the effluent hot exhaust gases leaving the heat exchanger not to exceed a predetermined limit;

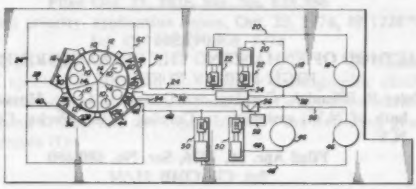
said predetermined limit of CO being sufficient to oxidize and remove the carbonaceous deposits from the outer surface of the heat exchanger without igniting the carbonaceous deposits and thereby preventing a run-away reaction which would damage the heat exchanger.

4,047,973

RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HYDRAULIC LATHING

John K. Williams, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 27, 1976, Ser. No. 736,056
Int. Cl.[2] B08B 3/02, 11/00
U.S. Cl. 134—10 **7 Claims**



1. A method of recovering selenium or a selenium alloy from the surface of an endless, flexible, xerographic belt comprising a ductile metal substrate having on its outer surface a thin layer of an organic resinous material which is overcoated with a relatively thicker layer of selenium or a selenium alloy which method comprises the consecutive steps of:

a. mounting the belt on a rigid mandrel having a ribbed outer surface;

b. subjecting the surface of the belt to one or more jets of high pressure water, said jets being expelled from one or more nozzles at a pressure of from about 8,000 to 11,000 pounds per square inch to strip the selenium or selenium alloy from the belt without substatially affecting the layer of organic resinous material to thereby form a water slurry of selenium or selenium alloy; and

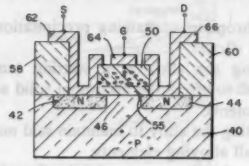
c. recovering the water slurry and removing the water to obtain substantially pure selenium or selenium alloy.

4. The method of claim 1 wherein the xerographic belt is cleaned by subjecting it to a 60–80 p.s.i. water spray before stripping the selenium or selenium alloy.

4,047,974
PROCESS FOR FABRICATING NON-VOLATILE FIELD EFFECT SEMICONDUCTOR MEMORY STRUCTURE UTILIZING IMPLANTED IONS TO INDUCE TRAPPING STATES

Eliyahou Harari, Irvine, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 30, 1975, Ser. No. 645,150
Int. Cl.[2] H01L *21/265, 21/324, 29/78*
U.S. Cl. 148—1.5 5 Claims



1. A process for fabricating a non-volatile field effect memory cell comprising the steps of:

a. forming active field effect transistor regions, including a source region, a gate region, and a drain region, on a silicon semi-insulating substrate;

b. forming a first layer of silicon dioxide on top of said gate region;

c. implanting ions into said silicon dioxide layer near the silicon interface whereby said implanted ions provide charge trapping sites for non-volatile memory operation;

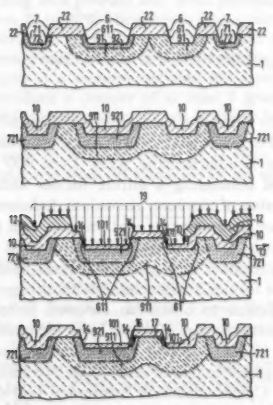
d. annealing said structure in a nonoxidizing ambient at a predetermined elevated temperature sufficient to diffuse any of said ions that have reached into said substrate but not affecting significantly the distribution of ions implanted into said fist silicon dioxide layer;

e. thermally growing a second layer of silicon dioxide under said first layer of silicon dioxide.

4,047,975
PROCESS FOR THE PRODUCTION OF A BIPOLAR INTEGRATED CIRCUIT

Dietrich Widmann, Unterhaching, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 2, 1976, Ser. No. 702,062
Claims priority, application Germany, July 2, 1975, 2529598
Int. Cl.[2] H01L *21/265, 21/302*
U.S. Cl. 148—1.5 16 Claims



1. The method of making a bipolar integrated circuit having transistors therein, which includes covering a semiconductor substrate of a first impurity type with an insulating layer, etching a plurality of non-intersecting troughs having sloping side walls in said insulating layer and partially into said substrate, doping by ion implantation the substrate side walls and the bases of said troughs with impurity ions opposite to the impurity type of said substrate, annealing said substrate to cause the impurities introduced by ion implantation to further diffuse and to thereafter provide base zones for said transistors, further doping the side walls and the bases of a first group of said troughs with impurity ions of the same impurity type as said substrate while leaving a second group of troughs still doped with impurities of the opposite type to said substrate, thermally oxidizing said substrate, then carrying out an ion etching step with a homogeneous vertical ion beam until portions of the substrate surface of the sloping side walls of said troughs are exposed, selectively doping by ion implantation to form emitter zones and collector zones, whereby transistors are formed between selected troughs, and forming circuit conductors on the sloping side walls in contact with said emitter zones, said collector zones and said base zones, respectively.

4,047,976
METHOD FOR MANUFACTURING A HIGH-SPEED SEMICONDUCTOR DEVICE

Jerry L. Bledsoe, Phoenix, and Clarence A. Lund, Mesa, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

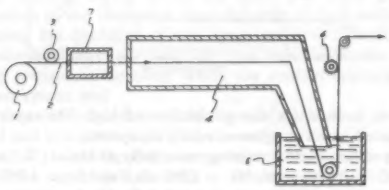
Filed June 21, 1976, Ser. No. 698,444
Int. Cl.[2] H01L *21/263*
U.S. Cl. 148—1.5 6 Claims

1. A method for increasing the switching speed of a semiconductor device comprising the step of selectively reducing minority carrier lifetime by high energy proton implantation.

4,047,977
METHOD OF CONTINUOUS GALVANIZING STEEL STRIP ON PARTIAL OR ONE SIDE

Katsuyoshi Yoshida, and Yukio Kitajima, both of Tokai, Japan, assignors to Nippon Steel Corporation, Japan

Continuation-in-part of Ser. No. 356,171, May 1, 1973, abandoned. This application Oct. 30, 1975, Ser. No. 627,472
Claims priority, application Japan, May 4, 1972, 47-44418
Int. Cl.[2] C23C *1/02*
U.S. Cl. 148—6.2 9 Claims



1. A method of continuous galvanizing a steel strip partially or one side, which comprises applying a silicone resin selected from the group consisting of polysilalkylenes and polysiloxanes to a part or on one side of the steel strip which is to be left non-plated in a subsequent continuous molten zinc coating, baking the silicone resin coated steel strip at a temperature ranging from 300° to 800° C for 2 to 30 seconds in an oxidizing atmosphere to deposit a masking film, and subjecting the steel strip to heat treatment in a reducing atmosphere and introducing the heat treated steel strip to a zinc coating bath.

6. A method according to claim **1**, in which the residual resin coating, after plating, is removed by etching with chromate treating liquid effective to prevent white rust on zinc coated steel plates.

4,047,978

PROCESSING COPPER BASE ALLOYS

Prakash D. Parikh, and Eugene Shapiro, both of Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 568,870, April 17, 1975, abandoned. This application Sept. 29, 1976, Ser. No. 727,728
Int. Cl.[2] C22F 1/08
U.S. Cl. 148—11.5 C 13 Claims

1. A process for obtaining an improved combination of strength and bend properties in copper base alloys having low stacking fault energy which comprises:

A. providing a copper base alloy having a stacking fault energy of less than 30 ergs per square centimeter consisting essentially of a first element selected from the group consisting of about 2 to 12% aluminum, about 2 to 6% germanium, about 2 to 10% gallium, about 3 to 12% indium, about 1 to 5% silicon, about 4 to 12% tin, about 8 to 37% zinc, and the balance essentially copper wherein said alloy is fully recrystallized and has a fine grain size of less than 0.015 mm;

B. cold working said alloy at least 60%;

C. annealing said alloy at a metal temperature of from 280° to 425° C to obtain a non-random texture with a plastic strain ratio measured 90° to the rolling direction of less than about 0.75; wherein the grain structure after said annealing is either unrecrystallized or partially recrystallized; and

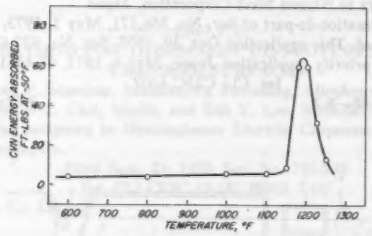
D. finally cold working said material less than 40%.

4,047,979

HEAT TREATMENT FOR IMPROVING THE TOUGHNESS OF HIGH MANGANESE STEELS

Raymond A. Grange, Roseburg, Oreg., and Robert L. Miller, Hempfield Township, Westmoreland County, Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 8, 1976, Ser. No. 730,894
Int. Cl.[2] C21D 7/14; C22C 38/04
U.S. Cl. 148—12 R 11 Claims



1. A method for the production of high Mn steels with enhanced notch toughness, which comprises,

hot rolling plate consisting essentially of Mn . . . 2.1 to 6%, C . . . 0.25% max., Ni . . . 1.5% max. and Si . . . 1.0% max., said hot-rolling producing a metallurgical structure which is substantially fully austenitic,

cooling the plate at a rate sufficient to transform said austenitic structure to austenite decomposition products consisting substantially of martensite, bainite and mixtures thereof,

annealing the plate composed of said austenite decomposition products at a temperature within the range A_1 to A_1 + 75° C for a time sufficient (i) to form at least 1% by volume of retained austenite at the grain boundaries, but insufficient to form more than a negligible amount of non-retained austenite and (ii) to provide a CVN increase, measured at −45.5° C of at least 20 ft-lbs over that of the same plate which has been similarly prepared but tempered at a temperature just below that of the A_1 of that steel.

4,047,980

PROCESSING CHROMIUM-CONTAINING PRECIPITATION HARDENABLE COPPER BASE ALLOYS

W. Gary Watson, Cheshire, and John F. Breedis, Trumbull, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 4, 1976, Ser. No. 728,976
Int. Cl.[2] C22F 1/08
U.S. Cl. 148—12.7 C 16 Claims

1. A process for improving both the strength and electrical conductivity properties of copper base alloys, which comprises:

a. casting a chromium-containing precipitation hardenable copper base alloy;

b. hot working the alloy at a starting temperature of 950°–1000° C to effect the maximum solid solution of all alloying elements;

c. rapidly cooling the alloy to maintain said maximum solid solution of all alloying elements;

d. cold working the alloy to a total reduction of at least 60%;

e. aging said alloy at 400°–500° C for one to 24 hours;

f. cold working the alloy to a further total reduction of at least 50%; and

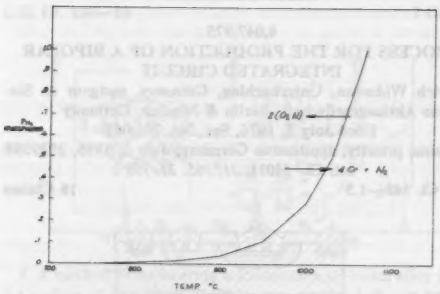
g. aging said alloy at 150°–250° C for 1 to 24 hours.

4,047,981

INTERNALLY NITRIDED FERRITIC STAINLESS STEEL STRIP, SHEET AND FABRICATED PRODUCTS AND METHOD THEREFOR

Jerry L. Arnold, Franklin, and Joseph A. Douthett, Monroe, both of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed June 30, 1976, Ser. No. 701,089
Int. Cl.[2] C22C 38/40; C21D 1/48
U.S. Cl. 148—16 16 Claims

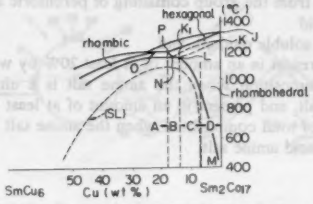


1. Internally nitrided substantially fully ferritic stainless steel cold reduced strip and sheet and products fabricated therefrom comprising a non-hardenable AISI Type 400 series ferritic stainless steel containing a nitride former chosen from the group consisting of titanium, zirconium, hafnium, columbium, vanadium, tantalum and rare earth metals, said nitride former being present in excess of the amount required to react completely with residual nitrogen and carbon in said steel, said excess nitride former being reacted with nitrogen internally to a depth sufficient to obtain an elevated temperature creep strength superior to that of AISI Type 316 austenitic stainless steel, by the 982° C Sag Test defined herein, and an oxidation resistance superior to that of AISI Type 316 austenitic stainless steel, by the Cyclic Oxidation Resistance Test defined herein, said nitrided strip, sheet and fabricated products exhibiting good room temperature formability, substantial freedom from chromium nitrides and chromium oxides, and containing less than about 5% austenite.

4,047,982
PERMANENT MAGNET AND PROCESS FOR PRODUCING THE SAME

Masato Sagawa; Takeaki Sakai, both of Yokohama; Tatsuji Sasaki, and Zenzo Henmi, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed July 8, 1976, Ser. No. 703,367
Claims priority, application Japan, July 18, 1975, 50-87196
Int. Cl.[2] H01F *1/02;* C22C *23/00*
U.S. Cl. 148—101 29 Claims



1. In a permanent magnet of an RCo type, wherein the R component Co is cobalt or both cobalt and iron, and the molar ratio of said R component to said Co component is from 1:5 to 1:8.5,

an improvement comprising replacing a part of said Co component with both vanadium and copper, in a manner such that said vanadium and said copper are included from 0.5 to 6% by weight, respectively, based on said components R and Co.

4,047,983
PROCESS FOR PRODUCING SOFT MAGNETIC MATERIAL

Edward C. Falkowski, Pittsburgh, and Carl E. Ruppel, Bridgeville, both of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 417,682, Nov. 20, 1973, abandoned, which is a continuation of Ser. No. 238,516, March 27, 1972, abandoned. This application Apr. 24, 1975, Ser. No. 571,169
Int. Cl.[2] H01F *1/14*
U.S. Cl. 148—105 4 Claims

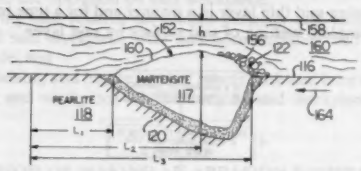
1. A process for producing a phosphorus containing iron soft magnetic material consisting essentially of iron up to 0.05% carbon, up to 1.0% manganese, up to 0.05% sulfur, up to 0.5% silicon, and from 0.5 to 1.5% phosphorus, which comprises the steps of: blending iron powder and ferro phosphorus powder containing from 22 to 30% phosphorus into a mixture containing from 0.5 to 1.5% phosphorus; pressing said blended mixture; and sintering said mixture in a non-oxidizing atmosphere of dry hydrogen at a temperature and for a period of time sufficient to produce a density of at least 7 grams per cubic centimeter, said sintering temperature being at least 2200° F; said soft magnetic material being characterized by a magnetizing force to reach 10 kilogauss of no more than 2.0 oersteds, and a coercive force from 10 kilogauss of no more than 0.9 oersted.

4,047,984
CORPUSCULAR ENERGY BEAM PRODUCED MICROASPERITIES

William H. Beike; Joseph C. Hafele; Ernest W. Landen, and Thomas J. Richards, all of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 17, 1975, Ser. No. 632,602
Int. Cl.[2] C21D *1/06;* C22C *35/00*
U.S. Cl. 148—152 8 Claims

1. A method of producing asperities on a body defining a surface, comprising the steps of selecting a body of unhardened pearlite carbon steel material having the property of expanding by grain structure change under the action of a beam of corpuscular energy, impinging a beam of corpuscular energy on said surface, varying the intensity of said beam from a minimum to a maximum value and then abruptly dropping the intensity back to said minimum so as to produce asperities,

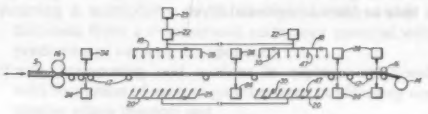


moving said body in a predetermined path relative to said beam while varying the intensity of said beam, and, repeating the above steps so as to produce a plurality of spaced, raised, martensitic asperities defining a height, length and width on said surface.

4,047,985
METHOD AND APPARATUS FOR SYMMETRICALLY COOLING HEATED WORKPIECES

Joseph Irwin Greenberger, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.

Filed Feb. 9, 1976, Ser. No. 656,689
Int. Cl.[2] C21D *01/00*
U.S. Cl. 148—153 2 Claims



1. In a method of cooling a heated elongated metallic workpiece so that the cross-sectional thickness thereof is symmetrically cooled as it assumes a longitudinal position,

supporting by spaced-apart means the lower surface of said workpiece while in said assumed position,

causing the workpiece while so supported to pass between upper and lower coolant discharge headers to subject the corresponding upper and lower halves of the workpiece to cooling, during which the upper and lower cooled halves of the workpiece have different cooling rates,

causing the discharge of said upper and lower headers to take the form of a rectangular cross-sectional laminar wall of coolant at the point where the coolant contacts the workpiece, and

varying the cross-sectional thickness of the wall of coolant of said lower header to vary the coolant rate of the lower half of said workpiece in comparison with the cooling rate of the upper half thereof, to substantially equalize the cooling rate of both halves.

4,047,986
EPITAXIAL FILM FORMATION OF A LIGHT EMITTING DIODE AND THE PRODUCT THEREOF

Jack Isaac Hanoka, Highland Park, N.J., assignor to Integrated Display Systems, Inc., Edison, N.J.

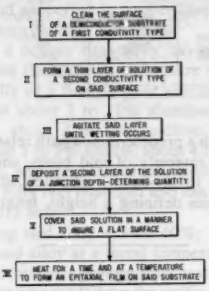
Filed May 10, 1976, Ser. No. 684,587
Int. Cl.[2] H01L *21/208*
U.S. Cl. 148—171 8 Claims

1. A method for forming an epitaxial film for a light emitting diode on a single crystal substrate of semiconductor material of a first conductivity type;

said method comprising the steps of clea ning the surface of said substrate;

coating said surface with a thin layer of a first solution from which an epitaxial film of a second conductivity type can be formed; wherein said first solution was formed at an elevated temperature, stored in a vessel at slightly above room temperature and applied at normal room temperature;

agitating said thin layer in a manner and for a time to ensure complete wetting of said surface by said layer;


I
CLEAN THE SURFACE OF A SEMICONDUCTOR SUBSTRATE OF A FIRST CONDUCTIVITY TYPE
II
FORM A THIN LAYER OF SOLUTION OF A SECOND CONDUCTIVITY TYPE ON SAID SURFACE
III
AGITATE SAID LAYER UNTIL WETTING OCCURS
IV
DEPOSIT A SECOND LAYER OF THE SOLUTION OF A JUNCTION DEPTH-DETERMINING QUANTITY
V
COVER SAID SOLUTION IN A MANNER TO ENSURE A FLAT SURFACE
VI
HEAT FOR A TIME AND AT A TEMPERATURE TO FORM AN EPITAXIAL FILM ON SAID SUBSTRATE

adding to said thin layer a second measure of said first solution from said storage vessel to form a second layer of solution substantially thicker than said first layer for determining the depth of a rectifying junction formed in said substrate during a subsequent heating step;

and heating said coated substrate at a temperature and for a time to form an epitaxial layer.

4,047,987

UNDERWATER BLASTING EXPLOSIVES

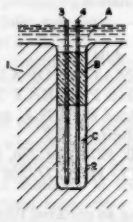
Masao Kusakabe; Shuzo Fuziwara, both of Hiratsuka, and Kazuo Shiino, Odawara, all of Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Division of Ser. No. 445,911, Feb. 26, 1974, Pat. No. 3,952,655. This application Dec. 11, 1975, Ser. No. 639,962

Claims priority, application Japan, Feb. 27, 1973, 48-22628; May 9, 1973, 48-51345; May 10, 1973, 48-51937

Int. Cl.[2] C06B *33/00, 33/10, 29/00;* C07B *21/00*

U.S. Cl. 149—37 **11 Claims**



1. A fluid explosive composition which comprises urea perchlorate as the essential explosive agent and a normally liquid combustible polar organic compound.

4,047,988

LIQUID MONOPROPELLANT COMPOSITIONS

Paul B. Weill, Newport, and Paul L. Darby, Middletown, both of R.I., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 29, 1967, Ser. No. 651,099

Int. Cl.[2] C06B *47/04*

U.S. Cl. 149—74 **10 Claims**

1. A liquid monopropellant adaptable for underwater propulsion which consists of an aqueous solution comprising;

a. a secondary or tertiary amine salt of an oxidizing acid selected from the group consisting of perchloric acid and nitric acid

b. a water soluble oxidant, and

c. water present in an amount of at least 20% by weight of total composition when the amine salt is a nitric acid amine salt, and present in an amount of at least 35% by weight of total composition when the amine salt is a perchloric acid amine salt.

4,047,989

METHOD FOR THE RECOVERY OF BLASTING OIL FROM EFFLUENTS FROM THE PRODUCTION OF NITROGLYCERINE-CONTAINING EXPLOSIVES

Sverre Ludvik Ostern, Ski, Norway, assignor to Dyno Industrier A.S., Oslo, Norway

Filed May 18, 1976, Ser. No. 687,649

Claims priority, application Norway, May 23, 1975, 751834

Int. Cl.[2] C06B *23/00*

U.S. Cl. 149—109.6 **3 Claims**

1. A method for recovering blasting oil selected from the group consisting of glycol dinitrate, glycerine trinitrate and mixtures thereof from an effluent resulting from the production of blasting oil-containing explosives which comprises extracting the blasting oil from the effluent with a liquid nitroaromatic in an extraction apparatus, said nitroaromatic liquid being a component used in the blasting oil-containing explosive such that the blasting oil-nitroaromatic extract can be utilized for the preparation of the final explosive.

4,047,990

PLASTIC BONDED EXPLOSIVE COMPOSITION

Charles W. Falterman, and Dino A. Sbrocca, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 1, 1967, Ser. No. 659,560

Int. Cl.[2] C06B *45/10*

U.S. Cl. 149—19.2 **3 Claims**

1. An improved plastic bonded explosive formulation comprising

Ingredients	Percent by weight
High explosive	70 to 85
Binder	15 to 30

said high explosive being a member selected from the group consisting of cyclotetramethylenetetranitramine, cyclotrimethylene-trinitramine and diaminotrinitrobenzene; and

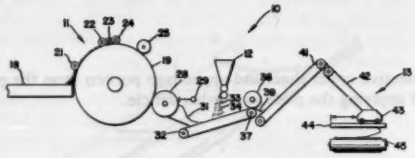
said binder consisting of a mixture of about 10 parts ethyl silicate type silicone resin and about 1 part polymethylsiloxane.

4,047,991

POLYESTER BATT AND METHOD FOR PRODUCING SUCH

George Sumner Buck, Jr.; Robert George Weyker, both of Memphis, and Arthur Gerard Ward, Arlington, all of Tenn., assignors to Fiberlok, Inc., Memphis, Tenn.

Filed Sept. 12, 1975, Ser. No. 612,786
Int. Cl.[2] B32B 31/00
U.S. Cl. 156—62.6 8 Claims



1. A process for producing a polyester batt comprising the steps of:

I. forming a thin web of polyester fibers;

II. contacting the web with an adhesive amount of particles of a copolymer of vinyl chloride and vinylidene chloride;

III. forming the web into a batt by laying the web transversely back and forth on a moving belt such that the batt comprises a plurality of webs; and then

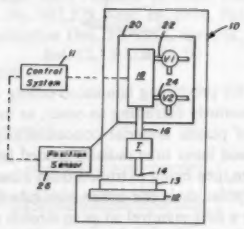
IV. heating the batt to a temperature above the sticking point of the copolymer but below the melting point of the polyester wherein the copolymer particles have a size range of from 1 to 200 microns, wherein the weight ratio of vinyl chloride to vinylidene chloride is 1:99 to 40:60 and wherein the weight ratio of the copolymer to the polyester is 1:99 to 30:70.

4,047,992

TURN-ON METHOD AND APPARATUS FOR ULTRASONIC OPERATIONS

David Alan Williams, Pittsford; Karl Sperber, Hilton, and Calvin Owen Stoutz, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 2, 1976, Ser. No. 663,024
Int. Cl.[2] B32B 5/18
U.S. Cl. 156—73.1 7 Claims



1. A method for operating on a workpiece with an ultrasonic transducer vibrating at a predetermined frequency, said transducer having a horn adapted to engage said workpiece, said method comprising the steps of:

energizing said transducer with a low level of power while out of contact with said workpiece, said low power level being sufficient to maintain vibration of said transducer at the predetermined frequency but insufficient to accomplish the operation on said workpiece;

effecting relative movement of said transducer and said workpiece toward one another while said transducer is energized with said predetermined low power level;

sensing the relative position of said transducer and said workpiece and generating a signal when said transducer is within a predetermined distance from said workpiece;

in response to said signal, increasing the power to said transducer to a level of power higher than said predetermined level, said higher power level being sufficient to accomplish the operation on said workpiece;

stopping said relative movement between said transducer and said workpiece with said horn engaging said workpiece; and

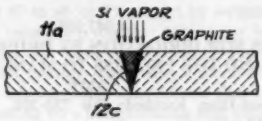
maintaining said higher level of power with said horn engaging said workpiece for operating on said workpiece.

4,047,993

METHOD OF MAKING AN ABRASION-RESISTANT PLATE

Heinrich Bartelmuss, A-8833 Teufenbach 63, Steiermark, Austria

Filed Nov. 13, 1975, Ser. No. 631,618
Int. Cl.[2] C04B 35/56, 37/00
U.S. Cl. 156—89 3 Claims



1. A method of making an elongate abrasion-resistant plate, comprising the steps of:

sintering a multiplicity of flat sections of like width and thickness from a comminuted refractory material with a predominant ceramic component;

closely juxtaposing said sections in coplanar relationship with formation of narrow gaps between confronting coextensive edges thereof; and

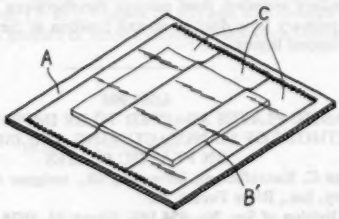
completely filling each of said gaps with a bonding agent of silicon carbide formed by melting pieces of graphite in said gaps in an atmosphere of silicon vapor, thereby uniting said sections into a continuous body.

4,047,994

PROCESS FOR MENDING CLOTHES

Shigeyoshi Komatsu, 7-20, 1-chome, Abenosuji, Abeno, Osaka, Japan (545)

Filed Feb. 11, 1976, Ser. No. 657,295
Claims priority, application Japan, Jan. 13, 1976, 51-3462
Int. Cl.[2] B32B 35/00
U.S. Cl. 156—98 3 Claims



1. A process for mending clothes which comprises:

adhering a thermoplastic synthetic resin film by fusion on the back of a basic cloth to be mended and on the back of a mending cloth to prevent fraying;

putting said mending cloth with said adhered film on the surface of said basic cloth with the film side downward to adjust pattern and temporarily fastening with a temporary fastening material which completely covers the mending cloth;

turning the cloths over to be back upward and stamping the clothes with a trimming die;

removing the basic cloth stamped out to leave the mending cloth which forms a fitting cloth;

putting a thermoplastic synthetic resin film on the circumference of the hole stamped out;

cutting the hole portion of the film in an X-shape to facilitate fitting of the fitting cloth in the hole;

fitting the fitting cloth in the hole with the back upward;

putting on a reinforcing cloth and adhering by fusion to the basic cloth and the fitting cloth through their thermoplastic synthetic resin film layers by light heat-pressing;

turning the cloths over and removing the remainders of the mending cloth and the temporary fastening material which remain on the surface of the basic cloth; and

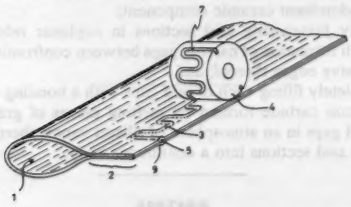
overlaying the surface of the cloth with a polyester film and strongly heat-pressing it to remove the synthetic resin film and the temporary fastening material which remain on the surface of the fitting cloth, the basic cloth and the fitting cloth being adhered by fusion at the border of the fitting portion by the thermoplastic synthetic resin.

4,047,995

HOSES FOR IRRIGATION BY DRIPPING AND THE LIKE AND THE PROCESS TO MANUFACTURE THE SAME

Jaime Leal-Diaz, Escobedo Sur 733-201, Monterrey, Nuevo Leon, Mexico

Filed Feb. 2, 1976, Ser. No. 654,542
Int. Cl.² B05B *1/14*
U.S. Cl. 156—203 **1 Claim**



1. The method of manufacturing irrigation hoses for dripping and the like comprising forming a primary flow duct from a thin plastic film having overlapped layers and passing a smooth roller with at least one groove defined therein over said overlapped layer of plastic film, said smooth roller portion sealing the overlapped layer of plastic and forming said primary flows duct while said at least one groove forming a secondary unsealed, fluid passage therebetween leading from said primary flow duct to an exit position at the edge of said overlapped layers.

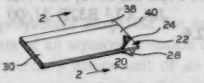
4,047,996

PLASTIC PLATES ADAPTED TO BE IMPRINTED AND METHODS OF MANUFACTURING AND IMPRINTING ON PLASTIC PLATES

James C. Kanzelberger, Riverside, Ill., assignor to Contemporary, Inc., River Forest, Ill.

Division of Ser. No. 454,166, March 25, 1974, Pat. No. 3,940,864. This application Sept. 15, 1975, Ser. No. 613,545
Int. Cl.² B32B *31/00*; B44C *1/24*
U.S. Cl. 156—220 **4 Claims**

4. The process of imprinting and applying an article comprising a plastic layer having a plate portion and an appendage portion, said layer having on one surface thereof an attached overlying carrier film with a transferable layer of coloring matter and a adhesive protected by a backing sheet on the other surface, said process comprising: hot stamping said plate with a heated die to mold and deboss the plastic of the plate and to transfer said coloring matter from said film and into the debossed portions of the plate; removing the carrier film,



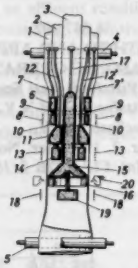
protective cover sheet and appendage portion from the plate; and applying the plate to another article.

4,047,997

METHOD FOR MANUFACTURING A FLATTENED CYLINDRICAL FILM CONSISTING OF LAYERS OF THERMOPLASTIC RESIN STRETCHED LENGTHWISE AND CROSSWISE

Michio Sudo, c/o Nikko Resin Co., Ltd., Fujikoshi Bldg. No. 23-7,5-chome, Higashi, Gotanda, Shinagawa, Tokyo, Japan

Continuation of Ser. No. 539,611, Jan. 8, 1975, abandoned, which is a division of Ser. No. 330,043, Feb. 2, 1973, Pat. No. 3,894,907. This application Feb. 26, 1976, Ser. No. 661,635
Claims priority, application Japan, June 26, 1972, 47-63273
Int. Cl.² B29C *27/02*
U.S. Cl. 156—229 **4 Claims**



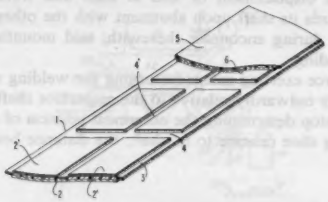
1. A method for producing laminated tubing comprising the steps of simultaneously extruding an outer, an intermediate and an inner tube of plastic material concentrically with at least said outer and said inner tube radially spaced from each other, said intermediate tube being extruded from a material having a lower melting point than the other two tubes; drawing said outer tube over a first mandrel so as to stretch said outer tube only in longitudinal direction; drawing said inner tube over a second mandrel which diverges in said longitudinal direction so as to mechanically stretch said inner tube in a direction transverse to said longitudinal direction to a diameter substantially equal to that of said outer tube; drawing said intermediate tube over a third mandrel so as to stretch said intermediate tube in both longitudinal and transverse directions; and heating said mandrels and transmitting heat from the same to said tubes during the stretching thereof so as to weld said outer tube stretched in said longitudinal direction, said intermediate tube stretched in said longitudinal and said transverse direction, and said inner tube stretched in said transverse direction together by heating said intermediate tube close to its melting point while pressing said tubes against each other.

4,047,998

METHOD OF POLARIZING A THERMOPLASTIC RESIN FILM

Shinsuke Yoshikawa; Syuuzi Terasaki, and Tohru Sasaki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1976, Ser. No. 667,311
Claims priority, application Japan, Mar. 17, 1975, 50-31152
Int. Cl.[2] B29C *19/06*
U.S. Cl. 156—275 5 Claims



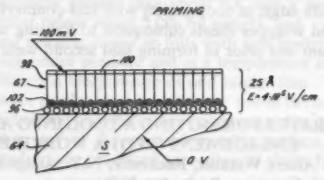
1. A method of polarizing a first thermoplastic resin film having metallic electrodes evaporated on both surfaces thereof, said film being of the type capable of being polarized into a piezoelectric film by application of an electric field of a predetermined amount thereacross, one of said electrodes consisting of a plurality of individual electrode elements separated and insulated from one another, the improvement comprising the steps of placing onto said one electrode a laminate of an additional thermoplastic resin film having an evaporated continuous metal coating on one surface thereof, said laminate being placed so that said metal coating contacts said plurality of individual electrode elements, and applying said electric field between said metal coating and the other metallic electrode of said first thermoplastic resin film.

4,047,999

METHOD OF MAKING A MOBILE ION FILM MEMORY

Francis John Salgo, 5907 Northhaven Road, Dallas, Tex. 75230

Division of Ser. No. 507,278, Sept. 19, 1974, Pat. No. 3,936,690. This application Dec. 22, 1975, Ser. No. 643,547
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—280 1 Claim



1. A method of making data storage film comprising steps of:
forming at least one monomolecular Langmuir film at a solution pH sufficient to cause vertical alignment of and strong van der Waals attraction between its organic stalks;
adhering said film to a conductive substrate;
bathing said film in a solution containing positive ions such that said ions are incorporated into said film and are mobile therein; and
removing excess water from said film.

4,048,000

PROCESS FOR PROVIDING IMPROVED HEAD POINTS IN CONCRETE BLOCK CONSTRUCTION WITH LATEX-EPOXY-CEMENT ADHESIVE

Elmer L. McMaster; Dallas G. Grenley, both of Midland, and Elton D. Prueter, Saginaw, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 492,566, July 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 295,374, Oct. 5, 1972, abandoned. This application Sept. 18, 1975, Ser. No. 614,729
Int. Cl.[2] C08K *3/34*; C09J *3/16*
U.S. Cl. 156—304 3 Claims

1. A process for providing improved head joints in concrete block construction comprising utilizing as the adhesive in the preparation of said head joints a plastic, aqueous binder composition comprising a mixture of the following in parts by weight of solids; from about 20 to about 85 hydraulic cement; from about 2 to about 25 of a styrene-butadiene polymeric latex, said latex being a plasticizer for the composition; from about 10 to 50 liquid synthetic thermosetting ambient temperature curable epoxide resin and a fat acid polyamide curing agent having an amine value of 290–320 therefor wherein the resin is from about 60 to about 95 percent by weight and the curing agent is the remainder; together with water for curing said cement, wherein said binder composition is prepared by
1. preparing a first mixture comprising a blend of said cement and said epoxide resin wherein said first mixture is subjected to mixing on a compounding mill under conditions of high shear,
2. preparing a second mixture comprising a blend of said polymeric latex with said curing agent wherein said curing agent is dissolved in methyl alcohol, and
3. admixing said first mixture and said second mixture prior to use as an adhesive.

4,048,001

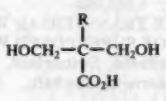
POLYURETHANE TEXTILE ADHESIVE

Kenneth Herald Remley, Warren, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 322,334, Jan. 10, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,670
Int. Cl.[2] C08G *18/12, 18/34*
U.S. Cl. 156—331 11 Claims

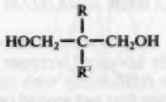
1. A process for preparing a polyurethane textile adhesive composition in the form of an aqueous dispersion comprising the steps of:
1. forming an isocyanate-terminated prepolymer in the presence of from about 10 to 30% by weight thereof of a low molecular weight polymeric plasticizer, by the reaction of from about 1.0 to 1.7 moles of tolylene diisocyanate per mole of a mixture of three hydroxy compounds consisting of:

(a)



wherein R is hydrogen, or lower alkyl,

(b)



wherein R is hydrogen, or lower alkyl, and R′ is lower hydroxyalkyl, and

(c)

$$H(-O-\underset{R_1}{\underset{|}{CH}}-CH_2)_q-OH$$

wherein R_1 is hydrogen, or lower alkyl, and q is an integer sufficiently large to provide an average molecular weight from about 1750 to about 5,000, the molar ratio of (a) to (b) to (c) ranging from 2.0-7.5: 1.0: 2.0-7.5

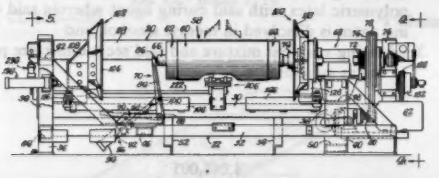
2. forming a latex by stirring said isocyanate-terminated prepolymer mixture in an aqueous medium containing a tertiary amine until all of the residual isocyanate groups have reacted with water;
3. adjusting the viscosity of the latex by adding a thickening agent thereto;
4. applying the composition obtained from step (3) to a textile material or other material; and
5. forming an adhesive bond between said textile material or said other material and another textile material with said composition.

4,048,002

TIRE BUILDING APPARATUS

Edwin F. Mallory, Niles, Mich., assignor to National-Standard Company, Niles, Mich.

Filed July 2, 1973, Ser. No. 375,750
Int. Cl.[2] B29H *17/22*
U.S. Cl. 156—403 **17 Claims**



1. In tire building apparatus, the combination of main frame means comprises a base frame portion, a rear frame portion integral with said base frame portion and having substantial longitudinal length, and an auxiliary frame portion; rotatable tire building drum means supported by said auxiliary frame portion on a longitudinal axis parallel to said rear frame porton; first and second tire bead placing means supported on said rear frame portion and movable axially inwardly and outwardly longitudinally of said drum means; and said rear frame portion, at the plane perpendicular to the midpoint of the axis of said rotatable tire building drum means and continuously for substantially the entire length of said rear frame portion, extending above a horizontal plane tangent to the bottom of said drum means whereby to form with said base frame portion rigid main frame means to maintain alignment of the tire building elements supported thereby.

4,048,003

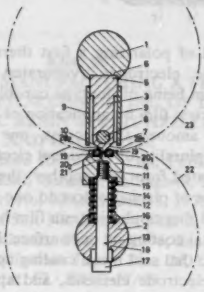
APPARATUS FOR THE TRANSVERSAL WELDING AND SEVERING OF SUPERPOSED WEBS

Hans-Ulrich Bolli, Schleitheim, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Dec. 10, 1975, Ser. No. 639,606
Claims priority, application Switzerland, Jan. 27, 1975, 914/75
Int. Cl.[2] B32B *31/18, 31/20*
U.S. Cl. 156—515 **6 Claims**

1. In an apparatus for the periodical transverse welding and severing of longitudinally advanced wrapper sheets being in a superposed, face-to-face relationship with respect to one another; the apparatus having first and second oppositely rotated, cooperating welding shoes between which the wrapper sheets pass; the first welding shoe being secured to a first rotary shaft and the second welding shoe being secured to a second rotary shaft; each rotary shaft having an axis; at least one of the welding shoes carrying heating means; a knife edge carried by the first welding shoe; a counterface carried by the second welding shoe and cooperating with the knife edge; upon each revolution of the welding shoes the latter simultaneously engage the wrapper sheets from opposite sides for transversely welding and severing the wrapper sheets; the improvement comprising:

a. mounting means for radially displaceably securing at least one of said welding shoes to its respective shaft to provide for a displacement of said at least one welding shoe towards its shaft upon abutment with the other welding shoe during encounter therewith; said mounting means including
   1. force exerting means for urging the welding shoe radially outwardly relative to the respective shaft; and
   2. a stop determining the outermost position of the welding shoe relative to its shaft; the distance between the



axes of said rotary shafts being smaller than the sum of the distances of said knife edge and said counterface from the axis of their respective rotary shaft in said outermost position of the welding shoes;

b. a wedge-shaped tapered head forming an outer terminal part of said first welding shoe; said head having a leading flank and a trailing flank and ending in an edge constituting said knife edge; and
c. two elongated rod-like resilient members secured to said second welding shoe adjacent and parallel to said counterface on either side thereof; during each revolution of said welding shoes one of said rod-like members engages said leading flank of said head for providing a first weld seam on said wrapper sheets and the other of said rod-like members engages said trailing flank of said head for providing a second weld seam on said wrapper sheets; said knife edge, in cooperation with said counterface, severing said wrapper sheets subsequent to forming said first weld seam and prior to forming said second weld seam.

4,048,004

APPARATUS FOR MOVING A TOOL INTO AND OUT OF ENGAGEMENT WITH A WORKPIECE

Joseph Albert Watkins, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,459
Int. Cl.[2] B32B *31/00;* G05G *1/04;* B23K *1/06*
U.S. Cl. 156—580.1 **13 Claims**

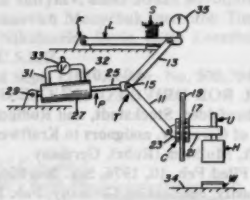
1. Apparatus for moving a tool into engagement with a workpiece; said apparatus comprising:

a toggle linkage including first and second links, each of said first and second links defining a central end and an outer end, and means pivotally connecting said central ends of said first and second links together for movement between folded and straightened conditions, the toggle linkage in the straightened condition defining a longitudinal axis

extending through the outer ends of said first and second links;

drive means for applying a force to said toggle linkage at said connected central ends to move said linkage from the folded condition to the straightened position, the straightening force applied by said drive means having essentially no component of force along said longitudinal axis in the straightened condition of said toggle linkage;

means connecting said toggle linkage and the tool for moving the tool into engagement with the workpiece in response to movement of said linkage from the folded condition to the straightened condition, and,



resilient means for exerting pressure between the tool and the workpiece in the straightened condition of said toggle linkage, said resilient means applying a force along the longitudinal axis in the straightened condition of the linkage;

whereby the pressure between the tool and the workpiece is essentially entirely the force exerted by said resilient means.

4,048,005

PROCESS FOR PRODUCING A LAMINATED METALLIC SHEET

Keisuke Nakagome, and Toshiharu Suzuki, both of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Continuation of Ser. No. 403,311, Oct. 3, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,380

Claims priority, application Japan, Oct. 2, 1972, 47-99648

Int. Cl.[2] C07D *233/80;* **H01L** *21/312*

U.S. Cl. 156—630 **20 Claims**

11. In a process for the production of heat resistant laminated articles comprising metallic sheets or foils with a polymer binder film laminated therebetween, the improvement comprising:

providing a binder film comprising a film of heat resistant heterocyclic polymer composed of polyhydantoin which exhibits no fusing point, said polymer film having an inherent viscosity greater than about 0.4, and a volatile matter content below about 5.0% by weight, and

laminating said metallic sheets or foils with said binder film therebetween under pressure and at a temperature above the heat distortion temperature of said binder film.

20. A process for producing a substrate for use in the manufacture of printed circuit boards further comprising chemically etching at least a part of the exposed metallic surface of a metallic laminated article produced according to claim **11**.

4,048,006

STRIPPING OF ELECTROPLATED NICKEL-IRON ALLOYS

Edward Paul Harbulak, Allen Park, and Ronald J. Lash, Warren, both of Mich., assignors to M&T Chemicals Inc., Greenwich, Conn.

Filed Aug. 5, 1975, Ser. No. 602,141

Int. Cl.[2] C09K *13/00;* **C23F** *1/00*

U.S. Cl. 156—664 **43 Claims**

1. A process for selectively removing nickel-iron alloys containing from 5% to 90% iron from the surface of a metal substrate which comprises contacting said nickel-iron alloys with an aqueous bath consisting of:

a. at least one nitro substituted organic compound containing at least one solubilizing group;

b. at least one organic amine or polyamine or substituted amine or polyamine; and

c. at least one aliphatic carboxylic acid or salt thereof, or a compound which will yield said carboxylic acid or salt thereof in solution, further characterized in that additionally said aliphatic carboxylic acid or salt thereof contains at least one substituent group selected from —NH_2, or quaternary amine salts thereof, —OH or —SH.

4,048,007

METHOD OF REMOVING SOLVENT RESIDUES FROM AQUEOUS PAPER PULPS

J. Frank Valle-Riestra, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 577,263, May 14, 1975, abandoned. This application July 9, 1976, Ser. No. 703,983

Int. Cl.[2] D21C *9/00*

U.S. Cl. 162—57 **10 Claims**

1. The method of removing residual amounts of volatile solvents from aqueous pulps of cellulosic fibers by gas stripping, wherein said pulp contains from about 0.4 to about 1.5 weight percent of said fibers comprising intimately contacting said pulp with *n* volumes of said gas under such conditions of agitation that the pulp consistency remains essentially uniform throughout, thereby removing at least a fraction of said solvent from said pulp,

the ratio of *n* to the volumes of said gas required to remove the same fraction of solvent in the same manner, from the same volume of water containing the same initial amount of said solvent, being within the range of from about 1.5/1 to about 6/1.

4,048,008

METHOD OF AND APPARATUS FOR FORMING SHEETS OF FIBROUS MATERIAL BETWEEN CONVERGING SIEVES

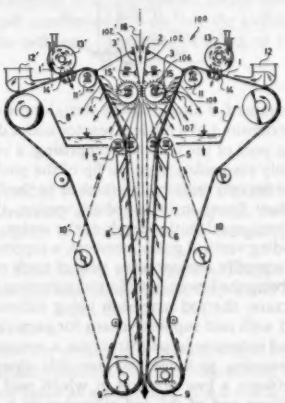
Michal Škrabák; Ernest Vavrík; Stanislav Kolařík, and Miloš Mazák, all of Bratislava, Czechoslovakia, assignors to Slovenska Vysoka Skola Technicka, Bratislava, Czechoslovakia

Filed Feb. 13, 1976, Ser. No. 658,079

Claims priority, application Czechoslovakia, Feb. 13, 1975, 902/75

Int. Cl.[2] D21F *1/00, 11/00;* **D21H** *1/06*

U.S. Cl. 162—104 **23 Claims**



1. In a method of forming a sheet of fibrous material, comprising the steps of advancing a pair of sieves in a downwardly

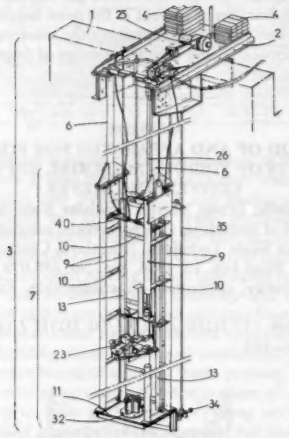
converging manner symmetrical to a longitudinal axis to bound a wedge-shaped working zone between respective inner surfaces thereof, and introducing a fibrous suspension having a liquid phase into the working zone to be formed into a sheet and simultaneously dried via the passage of the liquid phase through the sieves, the improvement wherein the introducing step comprises directing the suspension into a central area of the working zone, and wherein the method further comprises the steps of supporting, in the upper portion of the working zone, a pair of transversely spaced spraying rollers symmetrical to the longitudinal axis and in intercepting relation to the suspension directed into the central area, each roller having a plurality of vanes extending outwardly from the periphery thereof, and rotating the rollers in mutually opposite directions to propel the intercepted suspension in directions symmetrical to the longitudinal axis toward the converging surfaces of the working zone, whereby a uniform, controllable fiber distribution is obtained.

4,048,009

METHOD OF AND APPARATUS FOR CHECKING THE DIMENSIONS OF THE EXTENSIONS OF THE CONTROL RODS OF A NUCLEAR REACTOR

Jean-Claude Weilbacher, L'Isle Adam, France, assignor to Societe France-Americaine de Constructions Atomiques-Framatome, Courbevoie, France

Filed Mar. 8, 1976, Ser. No. 664,639
Claims priority, application France, Mar. 14, 1975, 75.08010
Int. Cl.[2] G21C *17/00*
U.S. Cl. 176—19 R **5 Claims**



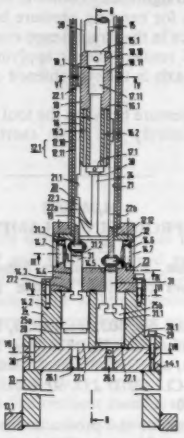
2. An apparatus for checking the straightness of elongated control rod extensions of a nuclear reactor under deep water in a fuel storage pool of the reactor, comprising: a vertical structure removably suspended from the lip of the pool and including: an upper section removably attached to the lip and forming an auxiliary floor, an intermediate section, the height of which is at least equal to the depth of the water, and a lower section including vertical guide members, a support at its lower end having a profile analogous to that of each rod extension and for receiving the lower end of a rod extension when placed in said structure, the rod extension being substantially vertically aligned with said support, means for centering the upper end of the rod extension in said structure; a measuring carriage carrying measuring pick-ups and movable along said guide members between a low position in which said pick-ups are below the lower end of the rod extension as it rests on said support, and a high position corresponding to the upper extension end; means for moving said carriage between the low and high positions and for stopping said carriage; and a readout system outside the pool and connected to said pick-ups to receive data therefrom.

4,048,010

CONTROL ROD DRIVE FOR NUCLEAR REACTORS

Gunther Eschenfelder, Stockstadt, and Rudiger Schultz, Offenbach, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Feb. 10, 1976, Ser. No. 656,896
Claims priority, application Germany, Feb. 11, 1975, 2505692
Int. Cl.[2] G21C *7/12*
U.S. Cl. 176—36 R **18 Claims**

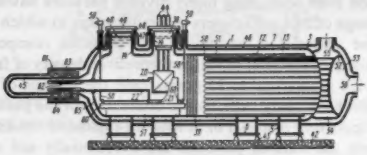


1. In a nuclear reactor, an hydraulic control rod drive comprising a vertically disposed tube, a piston rod mounted in said tube so as to be axially displaceable therein, means for hydraulically driving said piston rod in axial direction in said tube, means located at the upper end of said piston rod for coupling a control rod to said piston, and means for controllably blocking axial displacement of said piston rod in said tube, said blocking means being ineffective during rapid shut-down of the nuclear reactor, said blocking means comprising a threaded piston rotatably mounted on said piston rod and fixed thereon against axial displacement relative thereto, said threaded piston having a thread flank located at the outer periphery thereof, said vertically disposed tube being formed with an inner thread corresponding to said thread flank, said thread flank being received in said thread, said hydraulically driving means comprising at least two hydraulically controlled, axially displaceable switching rods mounted in axial guidance grooves formed at the inner perihery of said vertically disposed tube and interrupting said thread, said switching rods, in a clear position thereof, permitting rotary movement of said threaded piston and, in a locking position thereof, forming a stop for said thread flank and blocking rotary movement of said threaded piston, said switch rods being hydraulically controlled so as to be displaceable stepwise in axial direction during normal operation of the control rod drive.

4,048,011
FAST NUCLEAR REACTOR

Vladimir Mikhailovich Kovin, ulitsa Shalyapina, 19, kv. 11; Fedor Mikhailovich Mitenkov, ploschad Gorkogo, 2, kv. 26; Alexandr Vasilievich Ovechkin, ulitsa Tolbukhina, 6, kv. 2; Vladimir Alexeevich Pankratov, ulitsa Kultury, 3, kv. 456; Nikolai Ivanovich Savin, ulitsa Zvezdinka, 3, kv. 74; Tamara Alexandrovna Ternikova, prospekt Kirova, 2, kv. 63; Vladimir Jurievich Filippov, ulitsa Piskunova, 32, kv. 14; Dmitry Alexandrovich Khramov, ulitsa Kultury, 3, kv. 425; Evgeny Naumovich Chernomordik, ploschad Gorkogo, 2, kv. 30; Vladimir Ivanovich Shiryaev, ulitsa Strazh Revoljutsii, 22, kv. 19; Vladimir Romanovich Muzychuk, pereulok Timurovsky, 21, and Alexandr Nikolaevich Savin, ulitsa Zvezdinka, 3, kv. 71, all of Gorky, U.S.S.R.

Filed Sept. 13, 1974, Ser. No. 505,794
Int. Cl.² G21C *15/02*
U.S. Cl. 176—40 **5 Claims**



1. A fast nuclear reactor comprising: a main vessel; a side wall of said main vessel being cylindrical in shape; the axis of said cylinder lying in the horizontal plane; at least two pipe branches penetrating said side wall of said vessel; a nuclear reactor core within said main vessel; heat exchangers comprised of tubes are also disposed within said main vessel; a liquid metal coolant filling said vessel and in said pipe branches; a means for circulating said liquid-metal coolant passing through said core and heat exchanger tubes; and an inert gas medium in said pipe branches and contacting said coolant therein; said reactor further including an additional tubular vessel arranged internally of said main vessel and surrounding said core and said heat exchangers; and an annulus defined between said vessels to form a conduit for the coolant to pass through in a direction from said heat exchanger towards said means for circulating the coolant.

4,048,012
NUCLEAR POWER INSTALLATIONS

Brian Victor George, Willoughby Waterleys, and Colin James Drayrer, Oxon Way, both of England, assignors to Nuclear Power Company (Whetstone Limited), England

Continuation of Ser. No. 390,006, Aug. 20, 1973, abandoned. This application Dec. 23, 1975, Ser. No. 643,676
Claims priority, application United Kingdom, Aug. 24, 1972, 39409/72
Int. Cl.² G21C *15/00*
U.S. Cl. 176—60 **5 Claims**

1. A gas-cooled nuclear-reactor power-generating installation having

A. a nuclear reactor core,

B. a main stream-generating boiler,

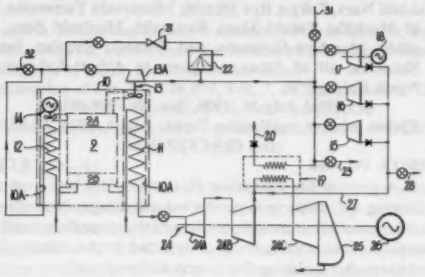
C. an auxiliary steam-generating boiler, independent of said main boiler and distinct therefrom,

D. a main coolant-gas circulator arranged to circulate coolant gas through the core and through the main boiler, independently of the auxiliary boiler, whereby to generate steam in the main boiler,

E. an auxiliary coolant-gas circulator arranged to circulate coolant gas through the core and through the auxiliary boiler, independently of the main boiler, whereby to generate steam in the auxiliary boiler,

F. a main turbogenerator which includes a steam turbine having a plurality of turbine stages through which steam from the main boiler passes in sequence, and

G. a steam reheater unit connected between two of the turbine stages to reheat the said steam from the main boiler,



H. the auxiliary boiler being connected to supply to the reheater unit steam which reheats the said steam from the main boiler.

4,048,013
PROCESS FOR PRODUCING SINGLE-CELL PROTEIN FROM METHANOL USING METHYLOMONAS SP. DSM 580

Fritz Wagner, Stockheim, and Hermann Sahm, Wolfenbuttel, both of Germany, assignors to Gesellschaft fur Molekularbiologische Forschung mbH, Braunschweig, Germany

Filed June 10, 1976, Ser. No. 694,792
Int. Cl.² C12B *1/00*
U.S. Cl. 195—49 **8 Claims**

1. A process for the production of single-cell protein from methanol, which comprises placing, in an aerated fermenter with or without a mechanical stirrer, a growing submerged culture of the obligate methanol-utilizing bacterium Methylomonas sp. DSM 580, produced under aerobic conditions, cultivating it in the presence of methanol, used as the sole source of carbon and energy, and mineral salts, in the presence or absence of growth promoting agents, this system further provided with air or oxygen enriched air at a cultivating temperature from 20° to 45° C, thereafter removing the cell mass out of the three phase system and drying, resulting in a biomass with a crude protein content of at least 60–76% (w/w), a nucleic acid content of 2–17% (w/w), an ash content of 4–6% (w/w), a lipid content of 3–8 (w/w), the culture fluid, after removing the cell mass, is capable of being, at least partially, recycled.

4,048,014
METHOD FOR OBTAINING UROKINASE

Masaharu Urakawa, and Hiroshi Sumiyama, both of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed July 6, 1976, Ser. No. 702,900
Claims priority, application Japan, July 16, 1975, 50-86765
Int. Cl.² C07G *7/026*
U.S. Cl. 195—66 B **6 Claims**

1. A method for obtaining urokinase which comprises contacting a partially purified urokinase-containing solution with diatomaceous earth at a pH range of 4.0 – 8.0, washing said diatomaceous earth adsorbing urokinase thereon with a buffer solution of pH 6.5 – 9.0 and eluting the urokinase from the adsorbate with a basic solution.

4,048,015

FORTIMICIN C AND PROCESS FOR PRODUCTION THEREOF

Takashi Nara, Tokyo; Ryo Okachi; Mitsuyoshi Yamamoto, both of Machida; Yasuki Mori, Kawasaki; Moriyuki Sato, Machida; Masahiro Sugimoto, and Yoshiaki Shimizu, both of Shizuoka, all of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Filed July 26, 1976, Ser. No. 708,681
Claims priority, application Japan, Aug. 1, 1975, 50-93182
Int. Cl.[2] C12D *9/14*
U.S. Cl. 195—96 4 Claims

1. A process for producing Fortimicin C which comprises culturing a Fortimicin C producing microorganism belonging to the genus Micromonospora in a nutrient medium until substantial antibacterial activity is detected in the culture liquor and thereafter isolating Fortimicin C therefrom.

4,048,016

IDENTIFICATION OF NON-FERMENTATIVE GRAM-NEGATIVE BACTERIA

Lucy A. Otto, Garden Grove, Calif., assignor to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Apr. 25, 1975, Ser. No. 571,502
Int. Cl.[2] C12K *1/10, 1/00*
U.S. Cl. 195—100 9 Claims

1. Assay medium for determining oxidative attack (OA) by Gram-negative non-fermentative bacteria (NFB) consisting essentially of an oxidative alkalination (OAL) assay medium containing 0.02 –0.05% by weight of casamino acids, bromthymol blue indicator, a substrate and buffered to pH 6.0 and an oxidative acidification (OAC) medium containing 0.02–0.03% by weight of tryptone, bromthymol blue indicator, a substrate and buffered to pH 6.7.

4,048,017

INTRODUCTION OF NUTRIENT MEDIUM INTO A FERMENTER

Frank Cornelius Roesler, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 4, 1975, Ser. No. 601,494
Claims priority, application United Kingdom, Aug. 14, 1974, 35754/74; May 19, 1975, 21288/75
Int. Cl.[2] C12B *1/00*
U.S. Cl. 195—109 5 Claims

1. A method for the continuous fermentation of a culture comprising a nutrient medium, one of the constituents of which is a growth limiting nutrient, and microorganisms capable of utilizing the medium for growth wherein the growth limiting nutrient is supplied to the culture in an amount which corresponds stoichiometrically with the locally available supply of oxygen at an average of at least one position per cubic meter of the effective volume of a fermenter in which the fermentation is performed, said effective volume being the volume in which, through mass transfer from gas bubbles, a positive dissolved partial pressure of oxygen can be maintained, whereby substantially all the limiting nutrient supplied at each position is consumed by the microorganisms present in the culture in the vicinity of that position before oxygen nutrient available to them in the culture in the vicinity of that position is exhausted and becomes the limiting nutrient.

4,048,018

METHOD OF CARRYING OUT ENZYME CATALYZED REACTIONS

Robert W. Coughlin, 902 Seventh Ave., Bethlehem, Pa. 18018, and Marvin Charles, 622 N. 29 St., Allentown, Pa. 18104

Continuation-in-part of Ser. No. 495,073, Aug. 5, 1974, abandoned, which is a division of Ser. No. 228,748, Feb. 23, 1972, Pat. No. 3,928,143. This application Mar. 9, 1976, Ser. No. 665,300
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.[2] C12B *1/00*
U.S. Cl. 195—115 13 Claims

1. An improved method of effecting enzymatic reactions in a reactant material which is contained in a carrier fluid by passing the carrier fluid past enzyme material attached to a supporting material comprising:

a. passing the carrier fluid generally upwardly through a reaction zone containing finely divided particles having a size range of 0.01 millimeters to 5 millimeters to which the enzyme material is attached, said particles composed essentially of material having a theoretical density of from about 2.4 grams/cm^3 to 25 grams/cm^3, the volume of the reaction zone being sufficient to contain all of the particulate supporting material in at least an expanded condition wherein the various particles are substantially not supported upon each other,

b. maintaining an upward velocity of carrier fluid through said reaction zone sufficient to suspend and agitate the said particulate supporting material, but insufficient to carry said particulate supporting material from reaction zone.

10. Apparatus for conducting enzymic reactions wherein enzymes are immobilized on particles that are fluidized by the upward flow of carrier fluid containing a reactant material, comprising tube means forming a reaction vessel, enzyme material immobilized on insoluble supporting particles within said reaction vessel, said particles having sizes ranging from about 0.01 millimeter to 5 millimeters and composed essentially of material having a theoretical density ranging from about 2.4 grams/cm^3 to about 25 grams/cm^3, pumping means for causing flow of carrier fluid upwards through said enzyme-bearing particles, with the restriction that the dimensions of said reaction vessel, the sizes and densities of said particles, and the characteristics of said pumping means are such as to result in fluidization of said particles while permitting said particles to remain within said vessel, when said carrier fluid is caused to flow through the said vessel.

4,048,019

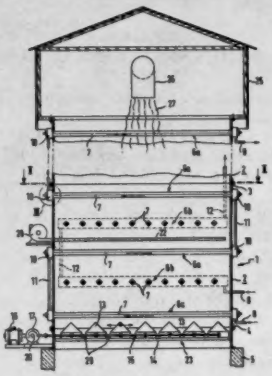
INSTALLATION FOR PRODUCING GREEN MALT FROM BARLEY AND/OR FOR STORING AND CONTINUOUSLY DISPENSING GREEN MALT

Christian Konrad Numberger, St. Wolfgang, Germany (8251)

Filed May 7, 1976, Ser. No. 684,106
Claims priority, application Germany, May 28, 1975, 2523709
Int. Cl.[2] C12C *1/04*
U.S. Cl. 195—129 7 Claims

1. An installation for continuously producing green malt from barley, comprising a container having a top with means for receiving barley, a plurality of superposed, substantially horizontal grids of stationary parallel hollow tubes extending between the walls of the container at different levels throughout the container, the tubes of adjacent grids being angularly offset in relation to each other, the tubes being connected in a

closed circuit to a supply system for cooling medium, whereby the germinating barley may be cooled solely through contact



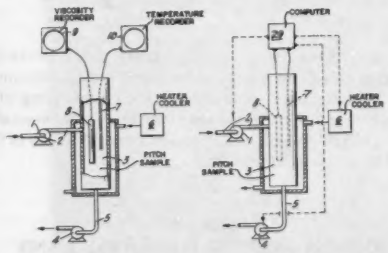
with the tubes, and a bottom on the container including means for dispensing green malt.

4,048,020

METHOD AND APPARATUS FOR THE CONTROL OF PITCH OPERATION

George R. Romovacek, Monroeville, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 383,151, July 27, 1973, abandoned. This application July 30, 1975, Ser. No. 601,071
Int. Cl.[2] B01D *3/42*
U.S. Cl. 196—132 4 Claims



1. An apparatus for controlling the operation of a pitch still reactor comprising a means for removing a sample of pitch from the pitch still reactor, a sample chamber for holding a sample of the pitch, a means for heating the sample, a temperature sensing means and viscosity sensing means that simultaneously measure the viscosity and temperatue of the sample and a means for comparing the simultaneously measured viscosity and temperature with a predetermined viscosity and temperature value and controlling the pitch still reactor in response to comparison.

4,048,021

METHOD OF PURIFYING CRUDE 2,6-NAPHTHALENEDICARBOXYLIC ACID DIMETHYL ESTER

Hiromitsu Takamoto; Kiyoshi Yamamoto; Nobuo Taneda; Toru Matsubayashi, and Gentaro Yamashita, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 548,074, Feb. 7, 1975, abandoned. This application Sept. 23, 1976, Ser. No. 725,834
Claims priority, application Japan, Feb. 12, 1974, 49-16307
Int. Cl.[2] B01D *3/10*
U.S. Cl. 203—91 4 Claims

1. In a method of obtaining purified 2,6-naphthalenedicarboxylic acid dimethyl ester by vacuum distilling crude 2,6-naphthalenedicarboxylic acid dimethyl ester under conditions of application of heat, the improvement which comprises vacuum distilling in a batch or continuous operation, a crude 2,6-naphthalenedicarboxylic acid dimethyl ester having an acid value (A_f), as expressed in milligrams of KOH required for neutralizing the carboxyl groups contained in one gram of said crude 2,6-naphthalenedicarboxylic acid dimethyl ester, of from 1.0 to 50, at a bottom liquid phase temperature T_b of from 190° C. to 340° C., and at a residual rate (W/F) of said dimethyl ester in the distillation zone which satisfies the relationship

$$0.9 \geqq W/F \geqq 10^{(\log A_f - 1/140.T_b)} \geqq 0.0075$$

wherein

W/F is the residual rate;

W is the rate of withdrawal of the bottoms liquid phase at kg/hr in the case of continuous operation, or the amount of the bottoms liquid phase in kg in the case of batch operation;

F is the rate at which the crude 2,6-naphthalenedicarboxylic acid dimethyl ester is fed into the distillation zone at kg/hr in the case of continuous operation, or the amount charged of said ester in kg in the case of batch operation;

A_f is the acid value of the crude 2,6-naphthalenedicarboxylic acid dimethyl ester fed to the distillation zone at a numerical value as indicated by the KOH, mg/g of crude 2,6-naphthalenedicarboxylic acid dimethyl ester; and

T_b is the temperature of the bottoms liquid phase as a numerical value as indicated by ° C and recovering the distilled-off purified 2,6-naphthalenedicarboxylic acid dimethyl ester as distillate and removing any free dicarboxylic acids and mono-methyl esters contained in the crude 2,6-naphthalenedicarboxylic acid dimethyl ester as bottoms liquid phase; the operation of said method within the limits of said relationship being effective to substantially obviate formation of scales within the bottom of said distillation zone, so as to enable recovery of a product ester of high product reproducibility.

4,048,022

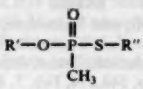
SIMULANT COMPOUND AND METHOD FOR TESTING AN AGENT ALARM

Joseph Epstein, and Lewis M. Berkowitz, both of Baltimore, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 2, 1976, Ser. No. 702,371
Int. Cl.[2] G01N *27/46, 27/50*
U.S. Cl. 204—1 T 5 Claims

1. A method of challenging a toxic V and G agent alarm so as to test the function and sensitivity of the alarm's conversion prefilter, heating element, and detection cell by using a simulant compound which has no significant toxicity, said alarm including an electrochemical cell with a silver electrode for the detection of CN^- ions, said cell having an electrolyte including an oxime for reaction with phosphonofluoridates, G agents and analogues thereof, whereby CN^- ions are generated, said alarm further including a conversion prefilter impregnated with $AgNO_3$ and KF for the conversion of V agents to their G analogues and a heating element for volatilizing the V agents,

comprising the steps of providing an air sample containing said simulant compound having the formula



wherein R'' is a lower alkyl group selected to produce a readily displaced alkylmercapto moiety when reacted with the $AgNO_3$ and KF of the conversion filter and R' is a longer chain alkyl group selected to give a volatility similar to that of the less volatile G agents, reacting said simulant compound with the $AgNO_3$ and KF of the conversion filter to produce the corresponding fluoridate, heating the resulting fluoridate by means of the alarm heating element to volatilize the fluoridate, passing the volatilized fluoridate to the electrochemical detection cell and reacting said fluoridate with the oxime of the cell electrolyte to produce CN^- ions, reacting the CN^- ions at the silver electrode of the cell to produce a change in potential and monitoring the change in potential to determine the alarm challenge.

4,048,023

ELECTRODEPOSITION OF GOLD-PALLADIUM ALLOYS

Peter Stevens, Parsippany, N.J., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed June 9, 1976, Ser. No. 694,278
Int. Cl.[2] C25D *3/56, 3/62*
U.S. Cl. 204—44 8 Claims

1. In an aqueous gold electroplating bath, free of cyanides and containing about 1 to 50 g/l of gold as an alkali metal gold sulfite and about 0.05 to 10 g/l of palladium as a complex, the improvement which comprises employing palladosamine chloride as the palladium complex and wherein said bath is buffered to a pH within the range of about 5.5 to 11.

4,048,024

BRIGHT LEVELLING ZINC PLATING

Direj Vallabhbhai Patel, South Harrow, and John Joseph Bernard Ward, Wantage, both of England, assignors to International Lead Zinc Research Organization, Inc., New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 669,276
Claims priority, application United Kingdom, Mar. 27, 1975, 13052/75
Int. Cl.[2] C25D *3/22*
U.S. Cl. 204—55 R 15 Claims

1. A solution for electrodepositing zinc comprising water, zinc ions in a concentration of at least 0.2 M, peptone in a concentration of at least 100 mg/l and thiourea in a concentration of at least 50 mg/l, the weight ratio of peptone to thiourea being from 1:1 to 5:1.

15. A chelating agent-free aqueous electrolyte solution for electrodepositing zinc comprising zinc ions in a concentration of at least 0.2 M and thallous ions in a concentration of from 1 mg/l to 10 mg/l.

4,048,025

ELECTROLYTIC PROCESS FOR SILVER OXIDATION

Dimiter Panayotov Nenov, and Verginia Ilieva Danova, both of Sofia, Bulgaria, assignors to VMEI "LENIN" — NIS Research Institution, Sofia, Bulgaria

Filed Feb. 2, 1976, Ser. No. 654,245
Int. Cl.[2] C25D *11/00, 9/06*
U.S. Cl. 204—56 R 1 Claim

1. Process for oxidation of silver and silver-plated articles by means of an alternating current of 50 hertz, wherein the electrolyte employed is a solution of cupric chloride having a concentration of 5 to 15 g/l and whereby a violet or dark red decorative corrosion resistant coating is obtained.

4,048,026

PROCESS FOR THE ENRICHMENT OF EUROPIUM CHLORIDE

Ekkehard Greinacher, Essen, Germany, assignor to Th. Goldschmidt AG, Germany

Filed Oct. 26, 1973, Ser. No. 410,104
Claims priority, application Germany, Nov. 6, 1972, 2254245
Int. Cl.[2] C01F *17/00;* C25B *1/24*
U.S. Cl. 204—61 2 Claims

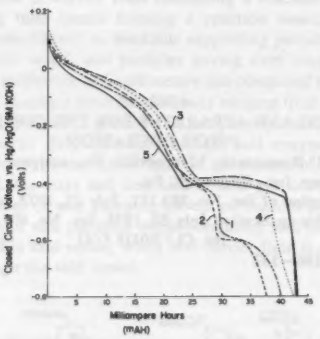
1. A process for the enrichment of europium chloride in a mixture of rare earth halides which comprises adding sufficient alkali, alkaline earth, or rare earth fluoride to a melt of rare earth halides containing europium chloride that the melt contains at least 4% weight of fluoride,
electrolyzing the mixture in the melt,
separating residual salts, cooling,
and washing said residual salts with water.

4,048,027

PROCESS FOR PRODUCING ELECTROLYTIC MnO_2 FROM MOLTEN MANGANESE NITRATE HEXAHYDRATE

Seymour Senderoff, Fairview Park, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,970
Int. Cl.[2] C25B *1/00*
U.S. Cl. 204—61 6 Claims



1. In a process for producing battery grade electrolytic manganese doixide by electrolyzing molten manganese nitrate hexahydrate, the improvement being the electrolyzing of the manganese nitrate hexahydrate at a temperature between about 115° C. and 126° C. and with an anodic current density of from about 140 to about 300 mA/cm^2.

4,048,028

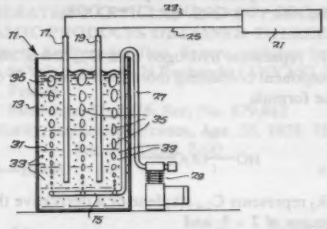
SORBENT PARTICULATE MATERIAL AND MANUFACTURE THEREOF

Karl Moeglich, Williamsville, N.Y., assignor to Clearwater Systems Inc., Williamsville, N.Y.

Filed June 22, 1976, Ser. No. 698,293
Int. Cl.[2] C25B *1/20*
U.S. Cl. 204—97 12 Claims

1. A process for the manufacture of a sorbent particulate material, substantially all of which is of a mean particle diameter of about 0.1 to 10 mm., which comprises passing an electric current between an anode of a metal capable of forming a flocculent hydroxide, which is selected from those of Groups

IIA, VIB, VIIB, VIII, IB, IIB, IIIA, IVA and VA and alloys thereof, and a cathode in a turbulent electrolyte containing



dispersed particulate material of the given size, to form a metal hydroxide and deposit it on the dispersed particulate material.

4,048,029

MANUFACTURE OF HYDROGEN

Walter H. Seitzer, West Chester, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed July 1, 1976, Ser. No. 701,828
Int. Cl.² C25B *1/02*
U.S. Cl. 204—129 **10 Claims**

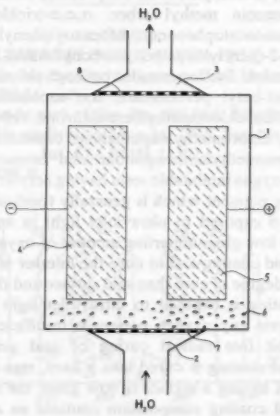
1. In the process of preparing hydrogen by passing a gas containing carbon monoxide over one side of a membrane which transports ionic oxygen and by passing steam over the other side of said membrane whereby the steam is converted to hydrogen and the carbon monoxide is oxidized to carbon dioxide, the improvement which comprises employing as said membrane a metal salt where the metal cation is selected from metals of Group IB, IIB, and VA, and the salt anion is an oxygen containing anion of a metal from Groups VB, VIB, and VIIB.

4,048,030

ELECTROLYTIC CELL FOR TREATMENT OF WATER

Jorge Miller, 8341 Noham 156, Germany

Filed Oct. 30, 1975, Ser. No. 627,192
Claims priority, application Germany, July 16, 1975, 2531850
Int. Cl.² C02B *1/82*; C02C *5/12*
U.S. Cl. 204—149 **1 Claim**



1. A continuous process for the treatment of water which comprises passing a stream of water to be treated upwardly through and past electrodes of an electrolytic cell containing particles whose density is higher than that of the water, controlling the speed of said stream to form a fluidized bed of said particles and mechanically maintaining clean said electrodes of said cell by means of the kinetic energy generated from the fluidization of said particles.

4,048,031

METHOD AND APPARATUS FOR PURIFYING EMULSIONS AND CONTAMINATED WATER WITH ELECTOLYSIS

Pentti Antero Valanti, 52200, Puumala, Finland

Filed Nov. 24, 1975, Ser. No. 634,424
Claims priority, application Finland, Nov. 26, 1974, 743404
Int. Cl.² C02C *5/12*
U.S. Cl. 204—149 **15 Claims**

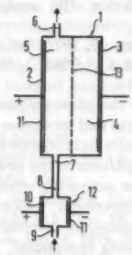
1. A method for purifying emulsions and contaminated water, such as water containing oil, with electrolysis, comprising maintaining at least one aluminum anode a determined distance from a cathode with said anode and cathode both being above a vessel, and treating the emulsion or contaminated water by running it into the space between the anode and the cathode to contact these electrodes, whereby flock is produced and said flock and water drop into said vessel, and then separating the flock from the thereby flocculated emulsion or water.

4,048,032

ELECTROLYTIC PURIFICATION OF AQUEOUS LIQUIDS IN THE PRESENCE OF SILVER IONS

Volker Eibl, Munich, Germany, assignor to Sachs-Systemtechnik GmbH, Schweinfurt am Main, Germany

Filed Aug. 27, 1975, Ser. No. 608,244
Claims priority, application Germany, Sept. 3, 1974, 2442078
Int. Cl.² C02B *1/82, 3/00*
U.S. Cl. 204—151 **4 Claims**



1. A method of destroying oxidizable contaminants in an aqueous liquid which comprises:

a. adding silver ions to said liquid in a first zone;

b. conveying said liquid from said first zone to a second zone;

c. passing electrolyzing current through said liquid in said second zone in the presence of said silver ions and said contaminants between an anode and a cathode, said anode being in direct contact with said liquid and insoluble in said liquid during said passing of said current;

d. independently controlling the magnitude of said current and the amount of said silver ions to respective values

jointly sufficient to destroy said contaminants in said second zone; and

e. withdrawing said liquid in purified condition from said second zone.

4,048,033

PROCESS FOR PREPARING PERCHLOROMETHYLBENZENE

Shigeo Yoshinaka; Seiji Uchiyama, and Masaharu Doya, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

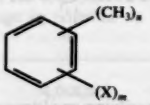
Filed Sept. 10, 1974, Ser. No. 504,989

Claims priority, application Japan, Sept. 10, 1973, 48-101814

Int. Cl.[2] B01J 1/10

U.S. Cl. 204—158 HA **11 Claims**

1. A process for the batchwise or continuous production of a perchloromethylbenzene, which comprises reacting a methylbenzene compound selected from the group consisting of compounds of the formula



wherein

X is chlorine or bromine, *m* is zero, 1 or 2 and *n* is an integer of from 1 to 3,

and compounds of the above formula wherein the side chain methyl group is partially chlorinated, with chlorine under the irradiation of light containing ultraviolet rays, the initial stage of the reaction being carried out in the presence of said perchloromethylbenzene in the reaction system as a solvent, in an amount of (1) from 0.3 to 15 times the weight of the starting methylbenzene compound when the process is carried out in a batchwise manner or (2) in an amount of from 40 to 99% by weight of the reaction mixture when the process is carried out in a continuous manner.

4,048,034

PHOTOPOLYMERIZATION USING AN ALPHA-AMINOACETOPHENONE

Michael Martan, Skokie, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 27, 1976, Ser. No. 718,293

Int. Cl.[2] C08F 2/46, 4/00

U.S. Cl. 204—159.23 **10 Claims**

1. In a process for the photopolymerization of a polymerizable monomer wherein said monomer is subjected to the emission from an ultra-violet light source having a wave length less than about 4000 Angstroms in the presence of a photosensitizing compound and an activating compound at polymerization conditions, the improvement which comprises utilizing an alpha-aminoacetophenone as combined photosensitizing compound and an activating compound.

4,048,035

PHOTOPOLYMERIZABLE COMPOSITION

Fumio Ide, and Tsuneo Kodama, both of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1975, Ser. No. 641,763

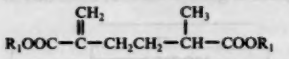
Int. Cl.[2] C08F 8/00; G03C 1/68, 5/00

U.S. Cl. 204—159.15 **6 Claims**

1. A photopolymerizable composition for image formation, which comprises:

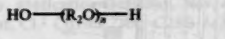
30 – 95 wt. % of an unsaturated polyester having an acid value of 5 – 100 which is the condensation product of a carboxylic acid component containing more than 40 mole % of a carboxylic acid compound having the formula

[I]



wherein R_1 represents hydrogen or a C_{1-4} lower alkyl with a polyol component containing more than 30 mole % of a polyol having the formula

[II]



wherein R_2 represents C_{2-4} alkylene or a derivative thereof and *n* is an integer of 2 – 5; and

70 – 5 wt. % of a photopolymerizable unsaturated monomer and a photosensitizer.

4,048,036

PROCESS FOR PRODUCING FILMS OF LOW GLOSS BY EXPOSURE TO ULTRAVIOLET LIGHT

Paul J. Prucnal, Monroeville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 24, 1974, Ser. No. 517,669

Int. Cl.[2] C08F 2/46, 4/00

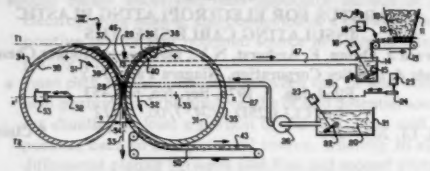
U.S. Cl. 204—159.23 **9 Claims**

1. In the method wherein a coating of an oxygen inhibitable ultraviolet light curable coating composition containing a photoinitiator selected from the group consisting of benzoin, methyl benzoin ether, ethyl benzoin ether, isopropyl benzoin ether, butyl benzoin ether, isobutyl benzoin ether, benzoin acetate, benzoin phenyl carbamate, α,α-diethoxyacetophenone, α,α-diethoxy-α-phenylacetophenone, α,α-dimethoxy-α-phenylacetophenone, 4,4'-dicarboethoxybenzoin ethyl ether, α-chloroacetophenone, α-bromoacetophenone, benzoin phenyl ether, α-methylbenzoin ethyl ether, benzoin acrylate, α-methylolbenzoin methyl ether, α,α,α-trichloroacetophenone, o-bromoacetophenone, 4-(benzoylphenylmethoxycarbonylimino)-2-(acrylyloxyethoxycarbonylimino)-1-methylbenzene, cumene hydroperoxide, benzoyl peroxide, dicumyl peroxide, tert-butyl perbenzoate, α,α'-azobisisibotyronitrile, phenyl disulfide, chloromethylbenzanthrone, chloromethylanthraquinone, chloromethylnaphthalene, bromomethylbenzanthrone, bromomethylanthraquinone and bromomethylnaphthalene, an oxygen inhibitable resin having acrylic unsaturation and a flatting pigment which is generally transparent to ultraviolet light is exposed to ultraviolet light in an atmosphere containing a low gloss imparting amount of oxygen to gel the surface of said coating and to cure the interior of said coating to a greater degree of cure than said surface and thereafter said exposed coating is exposed to ultraviolet light in an atmosphere wherein any oxygen present is insufficient to significantly inhibit free radical curing of said gelled surface, whereby said coating is cured into a hard, mar and abrasion resistant film having a surface of low gloss, the improvement wherein said coating composition contains an air cure promoter selected from the group consisting of anthraquinone, thioxanthone, 4-chlorobenzophenone, 4-methoxybenzophenone, benzophenone, 2-chloroanthraquinone, dibenzosuberone, o-benzoylbenzophenone, chlorinated terphenyls, mercaptoacetic acid and mercaptoethanol in an amount which will impart to said cured film a lower gloss than if said air cure promoter were absent.

4,048,037
METHOD AND MACHINE FOR MANUFACTURING A PLATE-LIKE MATERIAL MADE FROM AGGLOMERATED PARTICLES AND IN PARTICULAR CERAMIC PRODUCTS OBTAINED THEREBY

Sten Chronberg, Arnieres-sur-Iton, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Apr. 21, 1976, Ser. No. 679,012
Claims priority, application France, Apr. 25, 1975, 75.13091
Int. Cl.² C25B 7/00
U.S. Cl. 204—180 R **4 Claims**

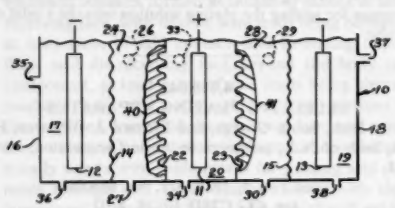


1. A method of preparing a plate-like material consisting of particles agglomerated together, selected from the group comprising solid particles, plastic particles and in particular clay-based particles, from a suspension in a liquid such in particular as water, said plate exhibiting a cohesiveness adequate for enabling its being worked subsequently according to any known technichal processes with a view in particular of manufacturing ceramic parts, wherein the improvement consists in that said method comprises the steps of: feeding said suspension such in particular as slip into a space left between two electrodes subjected to a given electrical voltage, located in front of each other and which are travelling continuously; subjecting said suspension to an electrophoretic action between said electrodes and an adjacent counter-electrode subjected to a different electric voltage; and adjusting the formations and in particular the thicknesses of the electrophoretic deposits built up upon said first-named electrodes so that when they leave the electrophoretic field under the travelling actions of said electrodes they will be fused together with their outer surfaces which have contacted each other; and recovering said plate built up continuously by both layers of electrophoretic deposits.

4,048,038
ELECTROFLOCCULATION CELL

Albert C. Kunkle, Macon, Ga., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 486,941, July 8, 1974, abandoned. This application May 24, 1976, Ser. No. 689,632
Int. Cl.² B01D 13/02
U.S. Cl. 204—180 R **27 Claims**



1. A method of electrokinetically separating finely divided clay particles suspended in an aqueous medium comprising the steps of

introducing a suspension of solid clay particles into an electrokinetic cell provided with an anode and a cathode, and two semi-permeable membranes impermeable to the clay particles separating the anode and cathode, the cathode and a first of said membranes forming a cathodic compartment in the cell, the anode and a second of said membranes forming an anodic compartment in the cell, the space between said first and second membranes constituting a slurry compartment in the cell;

directing the particle suspension into the said slurry compartment;

discharging solid particle depleted effluent from the said slurry compartment;

adding and circulating through the cathodic compartment an electrolyte having a pH of from 2–7;

adding and circulating through the anodic compartment an electrolyte to maintain a predetermined concentration therein;

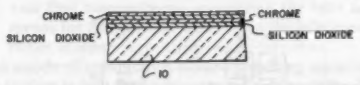
applying a direct current field between the anode and cathode to cause the solid particle to be electrophoretically deposited from the suspension onto the said second membrane overlaying the anode concomitantly with the aqueous portion of the suspension being caused to migrate electroosmotically through the said first semi-permeable membrane and into the cathode compartment; and

removing the solid particles from the said second membrane overlaying the anode and the water from the cathode compartment.

4,048,039
METHOD OF PRODUCING A LIGHT TRANSMITTING ABSORBING COATING ON SUBSTRATES

Helmut Daxinger, Wangs, Switzerland, assignor to Balzers Patent und Beteiligungs-AG, Liechtenstein

Division of Ser. No. 664,424, March 8, 1976. This application Oct. 21, 1976, Ser. No. 734,394
Claims priority, application Switzerland, Mar. 7, 1975, 003390/75
Int. Cl.² C23C 15/00
U.S. Cl. 204—192 P **8 Claims**



1. A method of producing a light transmitting, absorbing coating on a substrate, comprising depositing by cathode sputtering, alternate layers of silicon and chrome, with the silicon being deposited in an oxidizing residual gas atmosphere and the chrome in a non-oxidizing residual gas atmosphere.

4,048,040
CLINICAL TESTING APPARATUS

Henry D. Schwartz, Palo Alto, Calif.

Continuation-in-part of Ser. No. 320,264, Jan. 2, 1973, Pat. No. 3,941,565, and Ser. No. 640,542, Dec. 15, 1975, Pat. No. 3,994,171. This application Jan. 2, 1976, Ser. No. 646,288
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 R **16 Claims**

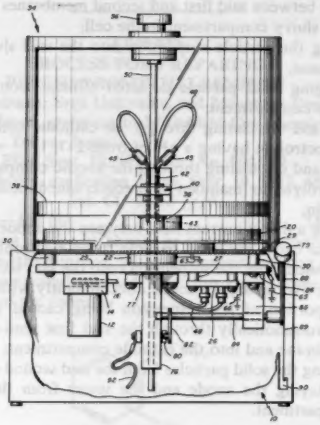
9. In a testing apparatus for measuring ions in body fluid which apparatus includes a rotatable turntable with a plurality of containers mounted thereon, a cover overlying the turntable and contacting the container mouths, and a chassis supporting the turntable and cover, the improvement comprising;

an electrostatic shield means having an open bottom disposed over the chassis to thereby enclose the turntable and cover,

said electrostatic shield means comprising a transparent dome, a membrane member having a transparent thin conductive film layer on the outside thereof, and means securing the membrane member within the dome,

means coupling the shield means to the chassis for supporting the shield means from the chassis,

and means associated with the chassis for lifting the shield means by lifting the supporting means whereby the shield



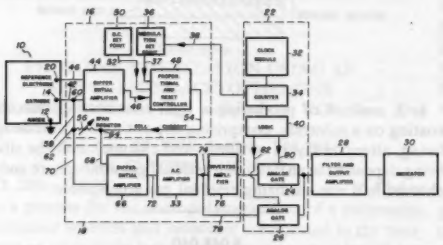
means has at least two stationary positions one of which permits access to the turntable.

4,048,041

ELECTRONIC SYSTEM FOR PROVIDING SPECIFICITY IN AN ELECTROCHEMICAL ANALYTICAL DEVICE

Donald J. David, and Huel C. Tucker, both of Centerville, Ohio, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 24, 1976, Ser. No. 689,287
Int. Cl.[2] G01N *27/48*
U.S. Cl. 204—195 R **8 Claims**



1. An apparatus for providing specificity in an electrochemical analytical device and for continuous determination of a nitroglycerin concentration in a sample solution which comprises:

a three element electrochemical cell having a grounded anode, a calomel reference electrode and a cathode electrode;

modulator circuit means, electrically coupled to said electrochemical cell, for supplying a square wave modulated negative potential signal to said cathode electrode;

demodulator circuit means, electrically coupled to said modulator means, for measuring the difference in the cell current of said electrochemical cell between said cathoe electrode and said anode electrode at the part and finish of said square wave modulated negative potential signal pulse and for generating an output signal proportional to said nitroglycerin concentration;

gating circuit means, electrically connected to said modulator and demodulator means, for supplying a continuous pulse signal to said modulator means and for controlling said demodulator means to allow only the cell current generated by the reduction of said nitroglycerin concentration to pass through said gating means, and to allow substantially all switching current transients generated in said electrochemical cell to decay,

inverter-amplifier means electrically coupled to said gating means for filtering and amplifying said cell current passed by said gating means; and

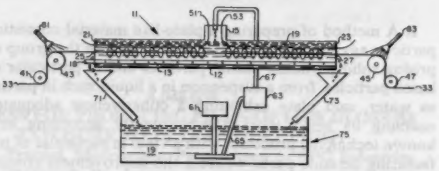
indicator means electrically connected to said amplifier means for providing an output signal proportional to said nitroglycerin concentration in said sample solution.

4,048,042

APPARATUS FOR ELECTROPLATING PLASTIC INSULATING CABLE SHEATHS

Edward J. Quinn, E. Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 5, 1976, Ser. No. 646,453
Int. Cl.[2] C25D *5/04, 7/06, 17/12*
U.S. Cl. 204—206 **5 Claims**



1. Apparatus for electroplating a wire cable having a plastic sheath with a conductive surface comprising:

a t-shaped tube having an elongated cylindrical portion and a t-inlet portion, each end of the elongated cylindrical portion having a central opening which is substantially coaxial with the axis of the cylinder and is at least larger than the outer diameter of the cable; cathode means external of the tube which are in electrical contact with the conductive sheath of the cable;

one or more anodes having a spiral configuration such that the axis of the spiral is approximately coaxial with the axis of the elongated cylindrical portion of the tube and which creates an electric field which is substantially uniform about the axis of the elongated cylindrical portion of the tube;

means for guiding the cable into the elongated cylindrical portion of the tube via one central opening, along the axis of the spiral and the axis of the cylindrical portion, and out of the tube via the other central opening, so that the axis of the portion of the cable in the cylindrical section of the tube is approximately coaxial with the cylindrical portion;

means for capturing plating solution which flows out of each central opening at the end of each cylindrical portion; and means for adding the plating solution into the t-inlet of the tube.

4,048,043

SELECTIVE PLATING APPARATUS

Maurice Bick, South Orange, and Richard J. DiMurro, Harrison, both of N.J., assignors to Auric Corporation, Newark, N.J.

Filed Feb. 6, 1976, Ser. No. 655,880
Int. Cl.[2] C25D *17/28, 5/02*
U.S. Cl. 204—224 R **6 Claims**

1. Apparatus for continuous electroplating of at least first and second mutually insulated selected portions of an electronic component or the like, while effecting differential plating thicknesses upon said portions, said apparatus comprising:

an electroplating station;

moveable applicator means adapted for carrying electroplating solution on a surface thereof;

means for continuously moving at least a portion of said applicator means surface through said electroplating station;

means for applying electroplating solution to said applicator surface;

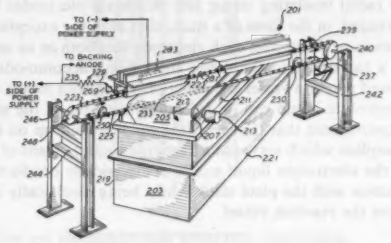
means for moving said components through said electroplating station with said portions to be electroplated in contact with said applicator surface;

a source of electrical plating potential;

means connecting the negative side of said potential source to each of said mutually insulated portions of said components during movement of said components through said electroplating station;

anodic means underlying said applicator surface at said electroplating station, and connected in a circuit with the positive side of said potential source in order to effect a plating current;

a shunt path means connected between one of said component portions and the positive side of said potential source for shunting at least a portion of the current to said one portion, back to said potential source, whereby to effect differential plating between said first and second portions



of said component in accordance with the current proportioning effected by said shunt path;

the components to be plated in said apparatus being of the type comprising an electrically conductive body terminating in a die-receiving face, and including a plurality of electrical contacts formed as insulated islands at said die-receiving face, with flexible wire leads being connected to at least some of said contacts and extending oppositely from said die-receiving face beyond the body of said component, at least some of said leads being electrically insulated from said body; said selective portions to be electroplated being said die-receiving face, and said electrical contacts; and wherein said apparatus includes electrically conductive guide means for guiding said components through said electroplating station with the said component body in electrical contact with said guide, and with said die-receiving face and said contacts in contact with the said applicator surface; the said means connecting the negative side of said potential source to at least said leads comprising an electrically conductive brush mounted at said electroplating station; and said shunt path being provided by a connection between said guide means and the positive side of said potential source.

4,048,044

WATER-PURIFYING APPARATUS

Volker Eibl, and August Reis, both of Munich, Germany, assignors to Sachs-Systemtechnik GmbH, Schweinfurt am Main, Germany

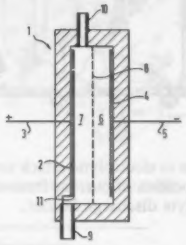
Continuation-in-part of Ser. No. 473,389, May 28, 1974, Pat. No. 3,923,632. This application Oct. 6, 1975, Ser. No. 619,696

Claims priority, application Germany, June 9, 1973, 2329628

The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.

Int. Cl.[2] C02B *1/82, 3/10*

U.S. Cl. 204—257 **4 Claims**



1. Apparatus for purifying water contaminated with microorganisms and having a specific resistance in the range of about 0.5×10^3 ohm.cm to about 6.6×10^3 ohm.cm which comprises:

a. a container enclosing a space adapted to hold water;

b. a diaphragm dividing said space into a first compartment and a second compartment and having respective faces in said compartments;

c. inlet means for admitting said contaminated water to said first compartment;

d. outlet means for withdrawing purified water from said first compartment;

1. said first compartment connecting the inlet and outlet means for flow of said water from the inlet means to the outlet means;

e. an anode of conductive, silver-containing material having a surface in said first compartment substantially parallel to the direction of said flow of water and to the face of said diaphragm in said first compartment at a distance of about 1 mm to about 4 mm from said diaphragm;

f. a cathode having a surface in said second compartment; and

g. lead means connected to said anode and to said cathode respectively for passing an electric current between said anode and said cathode through said contaminated water in said first compartment and a conductive liquid in said second compartment.

4,048,045

LENGTHENING ANODE LIFE IN ELECTROLYTIC CELL HAVING MOLDED BODY

Jeffrey D. Eng, N. Vancouver, Canada; Edward H. Cook, Jr., Lewiston, and Wilfredo E. Figueras, E. Amherst, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

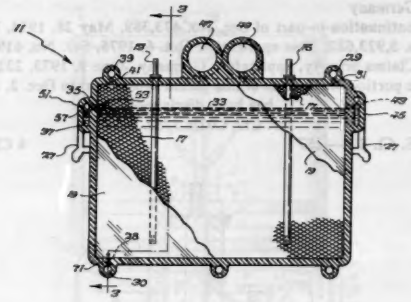
Continuation of Ser. No. 534,332, Dec. 19, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,140

Int. Cl.[2] C25B *1/26, 9/00, 11/10, 11/02*

U.S. Cl. 204—263 **6 Claims**

1. An electrolytic cell comprising a frame of non-conductive material, an anode, a cathode, a permselective membrane which divides the cell into anolyte and catholyte compartments, an anolyte discharge header and an anolyte drain header, and passageways connecting the anolyte compartment with said headers, said cell having a conductor passing through said passageway between said anode and said anolyte dis-

charge header thereby electrically connecting said anode and the anolyte in said discharge header, said conductor beng of a



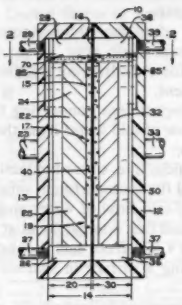
material resistant to electrolytic attack and facilitating the flow of a small proporation of current from said anode to the anolyte in said anolyte discharge header,.

4,048,046

ELECTROLYTIC CELL DESIGN

Robert Burns MacMullin, Lewiston, N.Y., assignor to The B. F. Goodrich Company, Akron, Ohio

Filed June 16, 1976, Ser. No. 696,583
Int. Cl.[2] C25B *1/16, 1/26*
U.S. Cl. 204—266 **12 Claims**



1. In an electrolytic cell comprising:

a. a cell wall portion at least partially defining boundary of said cell;

b. a first vertically extending electrode having a top portion and a bottom portion on a vertically extending surface;

c. a second vertically extending electrode, adjacent said first electrode and having a vertically extending surface opposing said vertically extending surface of said first electrode; and

d. an electrolysis zone between said first and second electrodes, said electrolysis zone having an upper portion, a lower portion and a middle portion intermediate said upper and lower portions and defined by the opposing surfaces of said electrodes;

e. an upper electrolyte plenum chamber adjacent said top portion of said first electrode; and

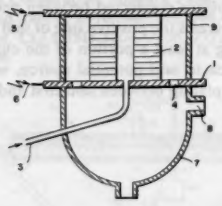
f. a lower electrolyte plenum chamber adjacent said bottom portion of said first electrode; the improvement wherein at least one of said first and second electrodes includes at least one vertically extending channel-like portion which at least partially defines a recirculation passageway extending between said upper and lower electrolyte plenums of said cell, said channel-like portion of said electrode spaced from said vertically extending surface such that no fluid communication between said channel-like portion and said surface is possible.

4,048,047

ELECTROCHEMICAL CELL WITH BIPOLAR ELECTRODES

Fritz Beck, Ludwigshafen-Oggersheim; Diethard Francke, Ludwigshafen; Heinz Nohe, Meckenheim; Heinz Hannebaum, Ludwigshafen-Oppau, and Manfred Stroezel, Ilvesheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jan. 14, 1976, Ser. No. 648,917
Claims priority, application Germany, Jan. 21, 1975, 2502167
Int. Cl.[2] C25B *1/26, 9/00*
U.S. Cl. 204—270 **2 Claims**



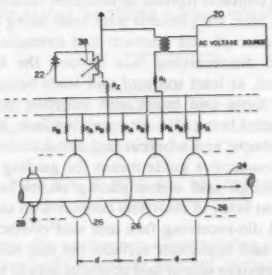
1. In an electrochemical cell, wherein plane electrodes of circular shape are located in a conjoint electrolyte chamber and are spaced from 0.05 to 2 mm apart, the spacing being fixed by radial insulating strips, sets of several electrodes being so arranged, in the form of a stack, that with the exception of the outermost electrodes each electrode acts both as an anode and as a cathode, and the entire stack being accommodated in a closed reaction vessel and being provided with means whereby electrolyte liquid can be fed into the center of the stack, the improvement that the electrode stack is built up on a central baseplate which serves as a carrier, contains means of feeding-in the electrolyte liquid and is in electrically conductive connection with the plate stack whilst being electrically insulated from the reaction vessel.

4,048,048

APPARATUS FOR MAKING A MEMORY WIRE

Charles Bennett, Framingham, and Emil Toledo, Newton, both of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 501,305, Aug. 28, 1974, Pat. No. 3,982,235.
This application Apr. 7, 1976, Ser. No. 674,356
Int. Cl.[2] C25D *17/00, 17/12*
U.S. Cl. 204—279 **1 Claim**



1. An electrical circuit for the electrodeposition of metal on a wire or for the removal of metal from the surface of a wire, comprising a plurality of physically spaced ring-like electrodes

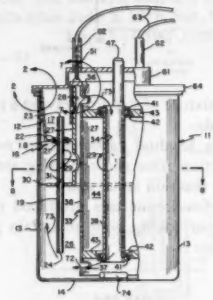
adapted to be immersed in an electrolyte and through which the wire is adapted to progressively pass, a source of D.C. potential, a source of A.C. potential, and connections for connecting said sources in electrically parallel relation and for applying equal values of the resultant potential to said ring-like electrodes, a reversing switch having contacts connected to said source of D.C. for reversing the polarity of said source of D.C. with respect to said ring-like electrodes, and a mercury contact pool at ground potential arranged in line with but to one side of said ring-like electrodes for grounding said wire as it advances through said electrodes.

4,048,049

TUBE GEL ELECTROPHORESIS DEVICE

Stanton A. Hoefer, San Francisco, Calif., assignor to Hoefer Scientific Instruments, San Francisco, Calif.

Filed Nov. 19, 1976, Ser. No. 743,483
Int. Cl.[2] G01N *27/26*
U.S. Cl. 204—299 R **14 Claims**



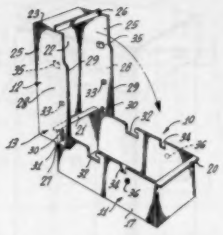
1. Tube gel electrophoresis apparatus, comprising:
an outer container having an upper open end and a lower closed end,
an annular inner container having an upper open end and lower closed end,
said annular inner container forming an upper buffer chamber therewithin and being supported at the upper open end of said outer container forming a lower buffer chamber therebetween,
a plurality of gel holding tubes sealably passing between and having opposed open ends exposed one each to said upper and lower buffer chambers said gel holding tubes having most of their length disposed in said lower buffer chamber,
a cooling core extending through said annular inner container into said lower buffer chamber, said cooling core having a cooling passage therethrough communicating with said lower buffer chamber and further having a contained coolant chamber therein,
an upper and lower buffer chamber electrode in each of said upper and lower buffer chambers respectively,
means for conducting a coolant to and from said contained coolant chamber
said lower buffer chamber and cooling core providing a path for circulating a buffer solution in said lower buffer chamber through said cooling passage, whereby heat generated in gels in said gel tubes during electrophoresis is conducted away by the circulating lower buffer solution and transferred in said cooling passage to the coolant.

4,048,050

CHILD-PROOF CONTAINER FOR MEDICINES AND THE LIKE

Ernest C. Hillman, 1277 S. Adams St., Glendale, Calif. 91205

Filed Feb. 7, 1977, Ser. No. 766,130
Int. Cl.[2] B65D *43/20, 85/56*
U.S. Cl. 206—1.5 **22 Claims**



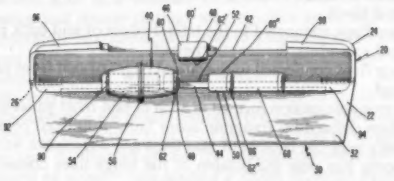
1. A closable container that is not readily openable by children comprising:
an enclosure;
a cover for said enclosure;
hinge means for connecting said cover to said enclosure while permitting both pivotal opening movement and longitudinal sliding movement of said cover relative to said enclosure;
pivot latch means for preventing said pivotal movement of said cover prior to longitudinal movement thereof; and
slide latch means for restraining longitudinal movement of said cover.

4,048,051

BOX WITH CHILD RESISTANT CLOSURE

Charles Gretz, Calabasas, Calif., assignor to Nutrilite Products, Inc., Buena Park, Calif.

Filed Dec. 21, 1976, Ser. No. 753,095
Int. Cl.[2] A45C *13/10, 13/18*
U.S. Cl. 206—1.5 **11 Claims**

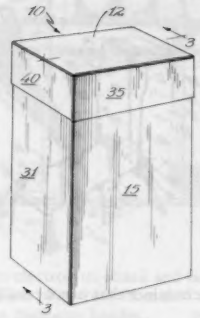


1. A container suitable for holding one or more small objects comprising:
first and second container portions movable between an open configuration and a closed configuration, the first and second container portions cooperating in the closed configuration to define a compartment;
latching means provided on the container portions, operable to releasably maintain the first and second container portions in the closed configuration;
slide closure means provided on the container portions and operable to slide between a first position and a second position while the container portions are in the closed configuration, in the first position the slide closure means prevents release of the latching means and in the second position the slide closure means permits release of the latching means; and
detent means provided on one of the container portions operable to releasably maintain the slide closure means in the first position.

4,048,052
RECLOSEABLE CARTON

William M. Tolaas, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Feb. 3, 1977, Ser. No. 765,227
Int. Cl.[2] B65D 5/54, 5/68, 17/24
U.S. Cl. 206—625 2 Claims



1. A blank made of foldable paperboard erectable into a reclosable flip top carton having a locking cover, said blank comprising;

a substantially rectangular sheet of said paperboard defined by parallel horizontal top and bottom edges and parallel vertical side edges;

three horizontal spaced apart hinge lines intermediate said top and bottom edges defining, respectively, a top panel, a back panel, a bottom panel, and a front panel;

minor closure flaps hingedly attached along the side edges of said top and bottom panels;

a flange assembly hingedly connected to said top edge of said blank including a rectangular top cover front flange connected to said top panel, a tab connected along each lateral edge of said front flange, and a top cover depending inner skirt section hingedly connected to the top edge of said front flange;

said skirt section having formed therein a transverse slit extending substantially horizontally intermediate the lateral edges thereof;

a locking flange hingedly connected to the bottom edge of said blank;

major flaps connected to the lateral edges of said back panel and extending the length thereof;

major flaps connected to the lateral edges of said front panel; and

a removable section formed in each of said front panel major flaps defined by frangible score lines positioned horizontally near the bottom of said flaps and a frangible vertical score line near the bottom of the hinge lines connecting said major flaps to said front panel.

4,048,053
UPGRADING SOLID FUEL-DERIVED TARS PRODUCED BY SHORT RESIDENCE TIME LOW PRESSURE HYDROPYROLYSIS

Marvin Greene, Somerset, N.J., assignor to Cities Service Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 627,448, Oct. 30, 1975, Pat. No. 4,012,311. This application Feb. 13, 1976, Ser. No. 657,790
The portion of the term of this patent subsequent to Mar. 15, 1994, has been disclaimed.
Int. Cl.[2] C10G 1/06, 13/24, 37/02
U.S. Cl. 208—8 12 Claims

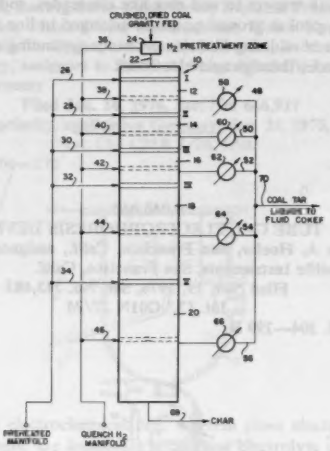
1. A process of producing and upgrading carbonaceous tars, comprising, in serial combination,

a. adding liquid or crushed solid carbonaceous material into a first reaction zone of a reactor having at least two non-catalytic reaction zones, and a pressure of between atmospheric pressure and 450 psia;

b. adding hot hydrogen to the stream of carbonaceous material to effect a reaction with same to produce reaction products, the reaction temperature in the reaction zone varying from about 400° to about 2000° C;

c. quenching the mixture of step (b) while insuring that the total residence time, including heat-up, reaction and quench time, varies from about 2 milliseconds to about 2 seconds;

d. removing at least a portion of the reaction products from



said quenched mixture of step (c), leaving a residual carbonaceous material;

e. introducing the residual carbonaceous material into a subsequent reaction zone and repeating steps (a)–(d) for said subsequent reaction zone; and

f. introducing carbonaceous tars produced in step (d) directly into a fluid coking zone to obtain gas, upgraded tars, and hot coke.

4,048,054
LIQUEFACTION OF COAL

Robert C. Green, Berkeley Heights, and Robert L. Dubell, Florham Park, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 23, 1976, Ser. No. 707,964
Int. Cl.[2] C10G 1/06
U.S. Cl. 208—8 10 Claims

1. A process for the production of liquid hydrocarbons from coal or similar liquefiable carbonaceous solids which comprises contacting said carbonaceous solids with a hydrogen-donor solvent and molecular hydrogen under liquefaction conditions in a liquefaction zone to produce a liquefaction effluent; separating said liquefaction effluent into a hot vapor stream and a liquid stream; recovering coal liquids in the solvent boiling range from said liquid stream; cooling said hot vapor stream sufficiently to condense vaporized normally liquid hydrocarbons from the vapor; separating condensed normally liquid hydrocarbons from the cooled vapor; mixing said coal liquids in the solvent boiling range with the cooled vapor and with makeup hydrogen to form a solvent hydrogenation feed stream; passing said solvent hydrogenation feed stream to a catalytic solvent hydrogenation zone maintained under solvent hydrogenation conditions; recovering a hydrogenated effluent from said solvent hydrogenation zone; separating said hydrogenated effluent into a vaporous fraction containing molecular hydrogen and a liquids fraction; recycling a portion of said vaporous fraction including molecular hydrogen and at least a portion of said liquids fraction to said liquefaction zone; purging a portion of said vaporous fraction; and recycling fluid separated from sAid hydrogenated effluent to said solvent hydrogenation zone as a quench.

4,048,055

PROCESS FOR REGENERATING AQUEOUS UREA SOLUTIONS

Hans-Georg Wegner, Toppenstedt, and Maximilian Kunert, Neu-Wulmsdorf, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Apr. 19, 1976, Ser. No. 677,935
Claims priority, application Germany, Apr. 18, 1975, 2517310
Int. Cl.² C07B 21/00; C10G 43/04
U.S. Cl. 208—25 5 Claims

1. In a process for regenerating aqueous urea solutions used in dewaxing of mineral oils containing n-paraffins by (a) reacting said urea solutions with said mineral oils to form solid n-paraffin-urea adducts, (b) recovering said urea solutions by decomposition of said adducts and, (c) reusing said urea solutions for the formation of adducts, the improvement which comprises:

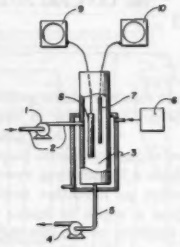
passing at least a portion of said aqueous urea solution recovered from the decomposition of said adducts in contact with acidic ion exchange resin.

4,048,056

METHOD FOR THE CONTROL OF PITCH OPERATION

George R. Romovacek, Monroeville, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 383,151, July 27, 1973, abandoned. This application June 2, 1975, Ser. No. 582,693
Int. Cl.² C10C 3/06
U.S. Cl. 208—41 1 Claim



1. A method for controlling the operation of a pitch still comprising the steps of:

a. simultaneously measuring the viscosity and temperature of a sample of the pitch at a changing but exactly known temperature;

b. comparing the measured value with a predetermined correlation of viscosity and temperature;

c. adjusting the parameters of the pitch still operation in response to the comparison.

4,048,057

INTEGRATED HEAVY OIL CRACKING PROCESS UTILIZING CATALYST SEPARATED FROM CRACKING IN PRETREATING ZONE

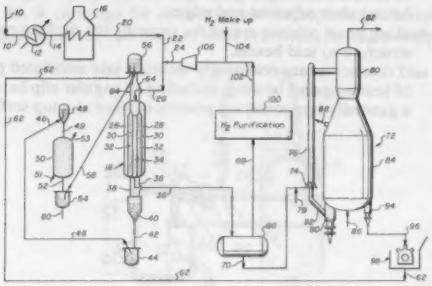
James R. Murphy, Houston, Tex., assignor to Pullman Incorporated, Chicago, Ill.

Filed Oct. 4, 1976, Ser. No. 729,528
Int. Cl.² C10G 23/00
U.S. Cl. 208—89 17 Claims

1. An integrated heavy oil cracking process for catalytically cracking a petroleum feedstock containing at least about 5 ppm metals and having a Ramsbottom carbon residue of from about 2 weight percent to about 25 weight percent comprising the steps of:

a. contacting the feedstock in a pretreating zone in the presence of 700 to 3000 psig partial pressure of hydrogen at a temperature from about 750° F. to about 850° F. with equilibrium catalyst withdrawn from a heavy oil cracking unit;

b. separating the treated feedstock from the equilibrium catalyst;



c. feeding the separated, treated feedstock of step (b) to a fluid catalytic cracking zone of a heavy oil cracking unit in the presence of a fluid cracking catalyst to produce a cracked effluent; and

d. withdrawing equilibrium catalyst from the heavy oil cracking unit for use in the pretreating zone of step (a).

4,048,058

METHODS TO BE USED IN REFORMING PROCESSES EMPLOYING MULTI-METALLIC CATALYSTS

Richard D. Petersen, Valparaiso, Ind., and Rodney L. Mieville, Evanston, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 9, 1975, Ser. No. 621,047
Int. Cl.² C10G 35/08; B01J 27/02
U.S. Cl. 208—138 39 Claims

22. A method for initiating the reforming of a petroleum hydrocarbon feedstock in a reforming reaction zone containing a bi-metallic catalyst or a multi-metallic catalyst, the various metals of said catalyst comprising the total active metal of said catalyst, which method comprises introducing a stream of hydrogen-rich gas containing light hydrocarbons into said reaction zone at a pressure of about 0 to about 1,000 psig, passing said stream through said reaction zone, adjusting the temperature in said reaction zone to a value of about 350° F. to about 470° F., injecting a sulfur-containing compound into said stream up-stream from said catalyst in order to provide a sulfur-carrying gas, contacting said catalyst with said said sulfur-carrying gas at said temperature and at a gas flow rate of about 0.25 to about 100 SCF of gas per pound of catalyst for a time that is sufficient to provide a sulfur concentration on said catalyst of about 0.1 to about 2.5 moles of sulfur per mole of total active metal, when sufficient sulfiding has occurred, discontinuing the injection of said sulfur-containing compound into said stream, adjusting the temperature, pressure, and hydrogen-rich-gas flow rate in said reaction zone to values that are to be used during the reforming operation, and introducing said feedstock into said reaction zone.

4,048,059

PALLET RACK AND DECKING COMBINATION

Robert J. Evans, Aurora, Ill., assignor to Aurora Equipment Company, Aurora, Ill.

Filed Nov. 24, 1975, Ser. No. 634,433
Int. Cl.² A47B 47/00
U.S. Cl. 108—155 3 Claims

1. In combination, a pallet rack comprising

a pair of spaced uprights,

spaced beams positioned between the spaced uprights with each beam having its opposite ends mounted on the spaced uprights,

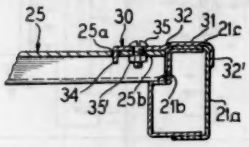
the beams being arranged in pairs with each pair disposed in

a common horizontal plane, each beam having beam ledges,

a decking panel structure having edges carried by the beam ledges, said edges abutting against a vertical wall portion of each beam ledge, a top surface of said decking panel having slots adjacent said edges,

decking panel retainer means for securing the decking panel structure to said beams,

said retainer means retainingly securing said associated pair of beams against bowing, including an angular clip having a generally horizontal leg portion secured to a top surface



of the decking panel structure and also resting on a top surface of said beams and a first down turned hooked end engaging a rear side of the associated beam, and

fastener means securing each of said angular clips to said decking panel structure to prevent the decking panel structure from being displaced from said beams and dropping vertically free of the associated spaced beams, said fastener means comprising a second hooked end on said horizontal leg portion positioned in said slot and a bolt means compressing together said retainer horizontal leg portion and top surface of said panel structure.

4,048,060

TWO STAGE HYDRODESULFURIZATION OF OIL UTILIZING A NARROW PORE SIZE DISTRIBUTION CATALYST

Kenneth L. Riley, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 29, 1975, Ser. No. 644,834
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—210 **23 Claims**

1. A process for hydrodesulfurizing a sulfur and metal-containing heavy hydrocarbon feed, which comprises:

a. contacting said feed in a first hydrodesulfurization zone with hydrogen and a first catalyst under hydrodesulfurization conditions to produce a first hydrodesulfurized hydrocarbon product, said first catalyst comprising an oxide or a sulfide of a Group VIB metal and an oxide or a sulfude of a Group VIII metal deposited on an alumina support, said first catalyst having a median pore radius being in the range from about 30 to about 60 Angstroms, and

b. contacting at least a portion of said first hydrodesulfurized hydrocarbon product in a second hydrodesulfurization zone with hydrogen and a second catalyst under hydrodesulfurization conditions, said second catalyst having a median pore radius greater than said first catalyst, the median pore radius of said second catalyst being in the range from about 70 to about 95 Angstroms, said second catalyst comprising a hydrogenation component selected from the group consisting of at least one elemental metal, metal oxide or metal sulfide of a Group VIB metal and at least one elemental metal, metal oxide or metal sulfide of a Group VIII non-noble metal, said hydrogenation component being composited with an alumina support, said second catalyst having the following physical characteristics: a total pore volume between 0.45 and 1.50 ml/g; less than 0.05 ml/g pore volume in pores with radii greater than 100 Angstroms; at least 0.40 ml/g pore volume having a narrowness index in pores with radii between said median pore radius of said second catalyst and from about 10 Angstroms above and 10 Angstroms below said median pore radius of said second catalyst, at least 75% of the pore volume of said second catalyst having said narrowness index with radii between the median pore radius and 10 Angstroms above and 10 Angstroms below said median pore radius of said second catalyst; less than 0.05 ml/g of the pore volume in pores with radii below 60 Angstroms, and a total surface area ranging between 130 and 500 square meters per gram.

4,048,061

PROCESS FOR REMOVAL OF METAL COMPOUNDS FROM HYDROCARBONS

George C. Blytas, 14323 Appletree St., Houston, Tex. 77024

Filed Apr. 5, 1976, Ser. No. 673,311
Int. Cl.[2] C10G *25/00*
U.S. Cl. 208—251 R **9 Claims**

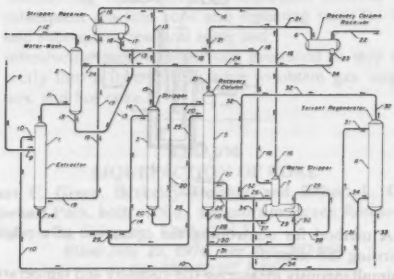
1. A process for the reducing of levels of compounds of metals of Groups I*b*, IV*a*, V*b*, VI*b* and VIII in light hydrocarbon liquids which comprises contacting said liquids with a sorbent consisting essentially of particulate active carbon having at least a majority of its pore volume in pores having a diameter greater than 0.9 nm, which sorbent has previously been oxidized by contact with a highly acidic oxidizing fluid and substantially separated from said oxidizing fluid.

4,048,062

AROMATIC EXTRACTION WITH SOLVENT RECOVERY AND REGENERATION

George F. Asselin, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 22, 1976, Ser. No. 679,274
Int. Cl.[2] C10G *21/28*
U.S. Cl. 208—321 **10 Claims**



1. A method for recovering and regenerating a substantially hydrocarbon-free, polar hydrocarbon selective solvent from a mixture of an aqueous selective solvent with polar hydrocarbons and non-polar hydrocarbons, which method comprises the steps of:

a. introducing said mixture into a first fractionation column, removing a water-containing non-polar hydrocarbon-rich stream from an upper portion of said first column and removing a first solvent-rich, polar hydrocarbon-containing stream from a lower portion of said first column;

b. introducing at least a portion of said first solvent-rich, polar hydrocarbon-containing stream into a second fractionating column, removing a polar hydrocarbon-rich stream, substantially free from solvent and non-polar hydrocarbons, from an upper portion of said second column, and removing a second solvent-rich stream, substantially free from hydrocarbons, from a lower portion of said second column;

c. introducing a first vaporous stripping medium into said second fractionation column through a locus above that from which said second solvent-rich stream is removed;

d. separating water from said non-polar hydrocarbon-rich stream removed from the upper portion of said first column in step (a) and vaporizing the same to form steam;

e. introducing a portion of said second solvent-rich stream into the upper section of a solvent regenerating zone and introducing steam from step (d) as a second vaporous stripping medium into the lower section of said regenerating zone;

f. recovering a regenerated solvent stream containing substantially all of said second vaporous stripping medium; and,

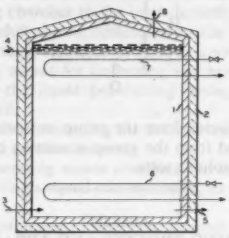
g. introducing said regenerated solvent stream, containing said second stripping medium, into said second fractionation column as at least a portion of said first vaporous stripping medium.

4,048,063

INDUCED TEMPERATURE GRADIENT SETTLING VESSEL

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 12, 1975, Ser. No. 586,324
Int. Cl.[2] B01D *21/00*
U.S. Cl. 210—72 **4 Claims**



1. a method for settling solids particles of micron and submicron size from a liquid in which the particles are contained, said method comprising:

a. admitting said liquid containing solids particles through an inlet into the lower portions of a settling vessel having vertical dimensions sufficient in reltion to the overall capacity of the vessel to allow a temperature gradient between the upper and lower portions of the liquid contained therein and sufficiently insulated to minimize changes of temperature inside the vessel in response to changes in ambient temperature outside the vessel;

b. cooling the liquid by indirect contact with a cooling fluid in the lower portion of said vessel;

c. allowing said liquid to pass upward into contact with means in the upper portion of said vessel for heating said liquid;

d. heating said liquid by indirect contact with a heating fluid;

e. retaining said liquid within the vessel for a time sufficient to allow settling of said solids particles at least from the liquid contained in the upper portions of said vessel;

f. removing clarified liquid through an outlet from the upper portions of said vessel; and

g. removing said settled solids particles from the lower portion of said vessel.

4,048,064

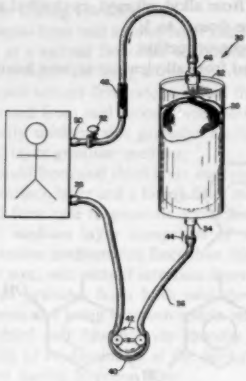
BIOCOMPATIBLE HEMOPERFUSION SYSTEM

William T. Clark, III, Number Six Davis Blvd., New Orleans, La. 70121

Filed Apr. 23, 1976, Ser. No. 679,853
Int. Cl.[2] A61K *23/02*; B01D *3/00*
U.S. Cl. 210—23 R **25 Claims**

12. A process for extracorporeal hemoperfusion comprising the step of passing the blood through a polymer-coated detoxicant composition adapted for reaction in an extracorporeal shunt with waste metabolites and toxins found in blood and which composition comprises a solid detoxicant having a semipermeable polymer coating: having an effective coating pore size permitting waste metabolites and toxins to diffuse therethrough; having free heparin therein; having an effective coating pore size permitting substantial retention of the free heparin by the polymer coating; being insoluble in blood.

18. A cartridge for extracorporeal hemoperfusion comprising a plurality of particles of solid detoxicant having a semiper-



meable polymer coating: having an effective coating pore size permitting waste metabolites and toxins to diffuse therethrough; having free heparin therein; having an effective coating pore size permitting substantial retention of the free heparin by the polymer membrane; being insoluble in blood held under movement-inhibiting compression within a blood-permeable container.

4,048,065

CONTROL OF CORROSION AND SCALE IN CIRCULATING WATER SYSTEMS BY MEANS OF PARTIAL ESTERS OF POLYFUNCTIONAL ORGANIC ACIDS

Tzeng Jiueq Suen, New Canaan; Arthur James Begala, Jr., Fairfield, and Martin Grayson, Cos Cob, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 456,119, March 29, 1974, Pat. No. 3,974,083. This application July 17, 1975, Ser. No. 596,786
Int. Cl.[2] C02B *5/06*
U.S. Cl. 210—58 **9 Claims**

1. A process for inhibiting corrosion and scale on ferrous metal surfaces in a circulating water system comprising the addition to circulating water in said system of from 10 - 500 parts per million parts water of additive selected from compounds having the formula:

$$HOOC-\underset{\underset{R}{|}}{(CH)_n}-(CH_2)_y-\underset{\underset{R}{|}}{(CH)_m}CO_2(CH_2CH_2O)_3H$$

wherein:

R is H or $-(CH_2)_{x-2}CH_3$

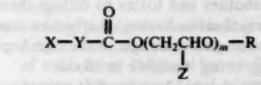
$x = 10$ to 18

$y = 0$ or X

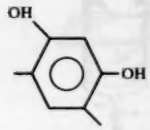
$n = 0$ or 1

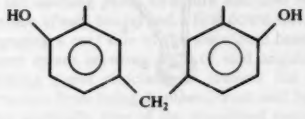
$m = 0$ or 1

3. A process for inhibiting corrosion and scale on ferrous metal surfaces in a circulating water system comprising the addition to circulating water in said system an effective amount of additive selected from partial ester compounds having the formula:



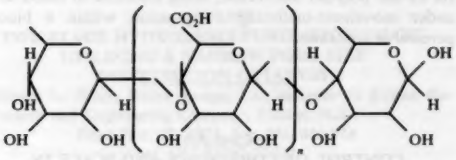
R is a hydrocarbon radical having 8 to 20 carbon atoms selected from alkyl, alkenyl, cycloalkyl and arylalkyl;
m is a value from 1 to 5;
Z is hydrogen or methyl;
Y is selected from alkylene or arylene having 2 to 8 carbon atoms,



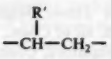


$(-CHOH-)_n$

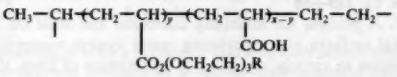
where *n* is from 2 to 6,



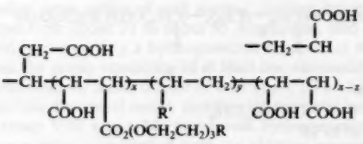
where *n* is from zero to 3,



wherein R′ is alkyl or alkenyl of 1 – 12 carbon atoms,



where *y* is ≦ *x*, where *x* ≦ 300, and



wherein *x* is ≧ 0, *x* = *y* ≧ *z*, where *x* + *y* ≦ 300 and R′ is phenyl or a hydrocarbon radical of from 10 to 18 carbon atoms, and
wherein *m* and Z are as defined before, and
M is selected from hydrogen, ammonium, alkylammonium, polyalkylammonium, alkali metal, or alkali earth metal; and
X is selected from COOM, $PO(OM)_2$ and SO_3M wherein M is as defined before.

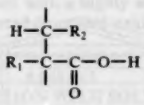
4,048,066

METHOD OF INHIBITING SCALE

Dionisio Guerrero Cuisia, Chicago, and Chih Ming Hwa, Palatine, both of Ill., assignors to Chemed Corporation, Cincinnati, Ohio

Filed Nov. 17, 1976, Ser. No. 742,521
Int. Cl.[2] C02B *5/06*
U.S. Cl. 210—58 **9 Claims**

1. A method for inhibiting deposits of scale, sludge, and other foulants in aqueous systems, said method consisting essentially of adding to the said systems 0.01 to 500 ppm of a composition selected from the group consisting of (A) water-soluble copolymers of styrene sulfonic acid with another polymerizable monoethylenic compound, and their water-soluble salts or (B) mixture of polystyrene sulfonic acid with an acrylic polymer whose polymer chain structure comprises units having the following formula:



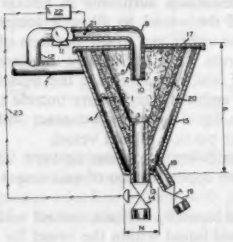
wherein R_1 is selected from the group consisting of H or CH_3 and R_2 is selected from the group consisting of H or COOH, and their water-soluble salts.

4,048,067

FILTERING PROCESS AND APPARATUS

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 12, 1975, Ser. No. 586,319
Int. Cl.[2] B01D *37/00, 21/26*
U.S. Cl. 210—73 R **8 Claims**



1. A filtering process comprising
a. tangentially introducing a liquid having entrained solid particles therein into a separating chamber confined by a downwardly converging, essentially conically shaped wall which is porous to said liquid but essentially impervious to said solid particles;
b. withdrawing a first portion of said liquid as a lean liquid approximately at the axis of said separating chamber from the upper section of said separating chamber and reintroducing at least a portion thereof tangentially into said separating chamber;
c. withdrawing a second portion of said liquid as a mixture of said solids and said liquid from the lower section of said separating chamber;
d. recovering a third portion of said liquid as clean liquid that has passed through said wall which is porous to said liquid as a product of the process, and wherein
the solids content of said first portion of liquid is sensed, a

corresponding signal is generated and said withdrawal of said second portion of said liquid is actuated responsive to said signal, whenever said signal has reached a value corresponding to an upper limit of solids concentration in said first portion withdrawn from the upper section of said separating chamber.

5. An apparatus for filtering a liquid containing solid particles comprising

a. a separating chamber having an upper section and a lower section confined by an essentially conically shaped wall, said wall

aa. converging in downward direction and

bb. being of sufficient porosity to permit passage of liquid but essentially impervious to solids;

b. first conduit means attached to said apparatus for essentially tangential introduction of a liquid into the upper section of said separating chamber;

c. second conduit means attached to said apparatus for withdrawal of lean liquid essentially in an axial and upward direction, said second conduit having a suction opening arranged in the upper portion and on the axis of said separating chamber and an outlet connected to said first conduit means such as to recycle the lean liquid from the separating chamber to the inlet thereof;

d. third conduit means connected to the lower portion of said separating chamber to remove a solids-rich liquid;

e. collecting means for collecting and removing from said apparatus the liquid penetrating through said conically shaped wall;

f. sensing means for sensing the solids content of the liquid in the second conduit means;

g. signal generating means connected to said sensing means for generating a signal corresponding to the solids content sensed;

h. a valve connected to said third conduit means; and

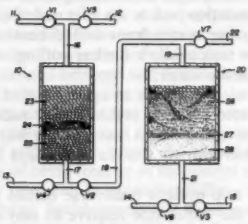
i. valve actuating means the input of which is connected to said signal generating means and the output of which is connected to said valve such as to actuate said valve whenever a signal is received which corresponds to an upper limit of the solids content in the liquid in the second conduit means.

4,048,068

METHOD OF AND APPARATUS FOR FILTERING

Gene Hirs, Livonia, Mich., assignor to Amsted Industries, Inc., Chicago, Ill.

Filed Jan. 9, 1974, Ser. No. 432,010
Int. Cl.[2] B01D *29/08*
U.S. Cl. 210—80 **7 Claims**



5. In a method of filtering, comprising the steps of:

flowing a contaminated liquid at a first flow rate through a first filter layer of substantially uniform graular medium size to obtain a partially filtered liquid flow, said first flow rate being sufficient to cause substantially all the particulate contaminants in said contaminated liquid to penetrate the inlet surface of said first filter layer to thereby minimize blinding off of the first layer by accumulation of contaminants at said inlet surface;

flowing the partially filtered liquid at said first flow rate successively through a first interface layer and a second medium layer, said second medium layer comprised of a substantially uniform granular medium size finer than that of said first filter layer, said interface layer comprised of a mixture of granules from both said first and second layers, said interface layer being in intimate contact with and between said first and second layers thereby reducing the accumulation of contaminants at the inlet surface of said second layer during filtration flow;

flowing the liquid from said second layer and through a third filter layer at a second flow rate less than said first flow rate, said first flow rate being at least approximately twice as great as said second flow rate, and said third filter layer being separated from said second layer and comprised of a substantially uniform size granular medium finer than said second layer granular medium;

flowing the liquid from said third layer successively through a second interface layer and a fourth filter medium layer at said second flow rate to generate a clarified liquid flow, said fourth medium layer comprised of a substantially uniform granular medium size finer than said third granular medium size, said second interface layer comprised of a mixture of granules from both said third and fourth medium layers and being between and in intimate contact with said third and fourth layer thereby reducing the accumulation of contaminants at the inlet surface of said second layer during filtration flow.

7. In a method of filtering a contaminated liquid, the steps of:

1. flowing the contaminated liquid at a first flow rate through a first filter vessel containing at least two distinct, vertically superimposed layers of granular filter medium, said first flow rate being sufficient to cause substantially all of the contaminants to penetrate the first layer in a direction of filtration flow, said layers being intermixed along an interface to enhance particulate contaminant penetration into the second layer in the direction of filtration flow, and the granules of said first layer having an average size larger than the average size of the granules in said second layer;

2. subsequently flowing the liquid from said first vessel through at least two additional distinct, vertically superimposed layers of granular filter medium in a second filter vessel at a flow rate which is approximately only about one-half the flow rate through the first vessel to cause substantially all of the non-filtered contaminants to penetrate the first layer in the direction of filtration flow in the second vessel yet be entrapped within either said first or second additional layers, said additional layers being intermixed along an interface to enhance particulate contaminant penetration into the second additional bed in the direction of filtration flow, and the granules of said first additional layer having an average size smaller than the average particle size of the granules comprising the second layer in said first vessel but larger than the second layer in the second vessel;

3. rejuvenating the filter layers by introducing backwash liquid into each of said vessels in the opposite direction of filtration flow at a rate to expand said layers and remove a substantial portion of accumulated contaminants; and

4. reforming the distinct superimposed layers and intermixed interface regions in each vessel after backwashing.

4,048,069

SMALL SURFACE LIQUID DECANTATION APPARATUS AND PROCESS FOR MAKING SAME

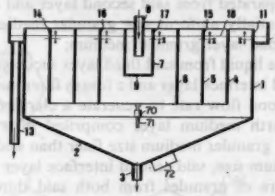
Roger Cuvillier, Darvoy Jargeau (Loiret), and Richard Cohen-Alloro, Olive (Loiret), both of France, assignors to Bureau de Recherches Geologiques et Minieres, France

Filed Feb. 2, 1976, Ser. No. 654,605
Int. Cl.[2] B01D *21/10*
U.S. Cl. 210—84 **21 Claims**

1. A small surface liquid decantation apparatus comprising a main revolution tank, with a central inlet, an exhaust for the

products decanted by the bottom and an exhaust on the upper peripheral edge for the purified liquid, wherein the main body comprises arcuate compartments defined at least in part by adjacent arcuate walls and in communication with the lower portion of the main body, provided with the exhaust for the decanted products, at least one indented zone, forming an overflow channel for exhausting the upper layer of purified water, being formed in the upper edge of a wall of each compartment, the said indented zones being circumferentially spaced from one compartment to the next.

16. A liquid decantation process comprising the steps of providing a space of revolution filled with a liquid mass, con-



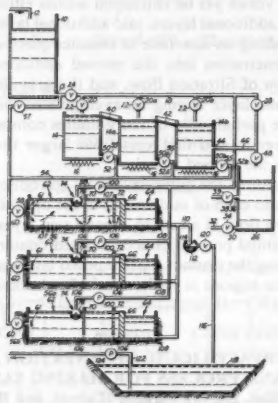
tinuously delivering to the center of the space of revolution and into the liquid mass a liquid holding in suspension particles having a density greater than the density of the liquid, presenting the movement of the liquid mass in a radial direction and effecting vertical decantation of the dense particles, and at the same time providing for movement of a surface layer of the liquid generally in a horizontal plane with each unit volume of the liquid in the surface layer progressively moving from the center of the space of revolution to an exhaust at the periphery of the space of revolution while controlling the path of movement of each unit volume of the liquid in the horizontal plane to be along successive spiral fractions, and removing the dense particles from a lower portion of the space of revolution.

4,048,070

OIL AND WASTE WATER RECEPTION FACILITY AND PROCESS

Carl F. Propp, Rte. 2, Box 97, Estacada, Oreg. 97023

Filed June 3, 1976, Ser. No. 692,283
Int. Cl.[2] B01D *35/00, 35/14*
U.S. Cl. 210—85 **5 Claims**



1. A system for recovering oil from an oil-water mixture and at the same time purifying the water sufficient to make it acceptable for deposit in disposal means, comprising

a. a holding tank arranged to initially receive a supply of oil-water mixture,

b. at least one decantation tank arranged to receive a mixture of oil and water from said holding tank and arranged to allow oil in the water to separate out and float to the top,

c. liquid conveying means leading from an upper portion of said decantation tank arranged to discharge oil,

d. a horizontal elongated separator tank open at the top and having inlet and outlets ends,

e. liquid conveying means leading from a lower portion of said decantation tank to the inlet end of said separator tank for directing water from said decantation tank to said separator tank to allow further settling out of oil that may remain in the water,

f. liquid conveying means leading directly from said holding tank to said separator tank,

g. control means associated with said latter liquid conveying means arranged to direct the flow of oil-water mixture to either of said decantation tank or said separator tank,

h. oil skimming means at an upper portion of said separator tank located between said inlet and outlets ends,

i. liquid conveying means leading from said skimming means for discharging oil that has separated in said separator tank,

j. circulating means in said separator tank for agitating the mixture of oil and water, comprising an upright partition in said tank on the outlet side of said skimming means, forming a second tank portion open at the top, said partition having a top edge forming a weir over which water spills to said second tank portion, said top edge having groove means therein extending transversely of said tank; said groove means functioning to produce a rippling effect in the liquid flowing thereover so as to further separate oil from water in said liquid,

k. an open top inspection tank,

l. liquid conveying means leading from the outlet of said separator tank to said inspection tank,

m. storage means having an outlet for the treated water,

n. liquid conveying means leading from said inspection tank to said storage means,

o. and oil storage means arranged to receive oil from said decantation tank and from said skimming means.

5. A system for recovering oil from an oil-water mixture and at the same time purifying the water sufficient to make it acceptable for deposit in disposal means, comprising

a. at least one decantation tank arranged to receive a mixture of oil and water and arranged to allow oil in the water to separate out and float to the top,

b. liquid conveying means leading from an upper portion of said decantation tank arranged to discharge oil,

c. a horizontal elongated separator tank open at the top and having inlet and outlet ends,

d. liquid conveying means leading from a lower portion of said decantation tank to the inlet end of said separator tank for directing water from said decantation tank to said separator tank to allow further settling out of oil that may remain in the water,

e. oil skimming means at an upper portion of said separator tank located between said inlet and outlet ends,

f. liquid conveying means leading from said skimming means for discharging oil that has separated in said separator tank,

g. at least two upright transverse baffles in said separator tank on the outlet side relative to said skimming means, said baffles extending above the fluid level in said separator tank,

h. means defining a fluid path adjacent the lower end of said baffles whereby water in flowing between the inlet and outlet of said separator tank must circulate down and then upward at said baffles,

i. an upright partition in said tank on the outlet side of said baffles forming a second tank portion open at the top, said partition having a top edge forming a weir over which water spills to said second tank portion,

j. said top edge having groove means therein extending transversely of said tank ; said groove means functioning

to produce a rippling effect in liquid flowing thereover so as to further separate oil from water in said liquid,

k. an open top inspection tank,

l. conveying means leading from said separator tank to said inspection tank,

m. storage means having an outlet for the treated water,

n. liquid conveying means leading from said inspection tank to said storage means,

o. and oil storage means arranged to receive oil from said decantation tank and from said skimming means.

4,048,071

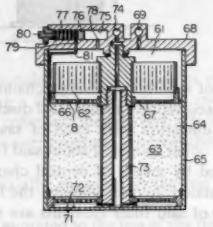
LIQUID FILTERING DEVICE

Yoshio Yamada, 101-118, Hatta, Higashi, Fukuoka, Fukuoka, and Yoneji Wada, 1-1, Hakataekimae 2-Chome, Hakata, Fukuoka, Fukuoka, both of Japan

Continuation of Ser. No. 461,435, April 15, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,882

Int. Cl.[2] B01D *35/00, 35/14*

U.S. Cl. 210—90 **1 Claim**



1. A filter device comprising:

a tank covered by a cover plate;

a hollow shaft within said tank, said shaft having a radial opening through the wall thereof;

a first filter unit for removing relatively coarse contaminants;

a second filter unit for removing relatively fine contaminants;

said first and second filter units being connected in cascade in said tank with said first filter unit above said second filter unit;

said first filter unit comprising:

a coil of spirally wound filter web which is liquid tightly mounted about said hollow shaft;

a liquid impervious flexible coating covering the outer peripheral surface of said coil;

supporting disc means, secured to said hollow shaft and liquid tightly contacting the outer periphery of a first, lower end of said coil, for radially receiving and positioning said first, lower end of said coil;

a space being defined between said first, lower end of said coil and said supporting disc means; and

said coil having a second, upper end, the outer periphery of which is unsupported and radially unrestrained, said filter web of said second, upper end of said coil having the property of being free, upon the receipt and absorption thereby of liquid, to expand radially;

means for supplying liquid containing solid contaminants into said second, upper end of said coil of said first filter unit and passing said liquid axially through said coil from said second, upper end to said first, lower end thereof, for causing said filter web of said second, upper end of said coil to radially expand and thereby trap relatively coarse contaminants, for then passing said liquid still having therein relatively fine contaminants through said second filter unit and thereby purify said liquid, and for passing the thus purified liquid through said radial opening and into the interior of said hollow shaft; and

means responsive to the pressure differences between the inlet and outlet sides of said first filter unit for determining the amount of said contaminants collected by said first filter unit, said pressure difference responsive means comprising:

a cylinder formed in said cover plate of said tank;

a piston slidably positioned in said cylinder;

a first passage communicating the interior of said cylinder on a first side of said piston with said inlet side of said first filter unit;

a second passage communicating the interior of said cylinder on a second side of said piston with said outlet side of said first filter unit;

a spring positioned in said cylinder and in contact with said second side of said piston; and

a switch mounted on said cover plate at a position to be operated by said piston when said piston is moved against the force of said spring by a pressure difference between said inlet and outlet sides of said first filter unit.

4,048,072

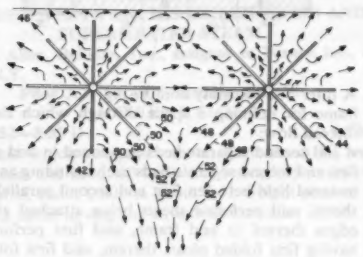
AIR DIFFUSERS

J. Robert McCullough, West Chester, Pa., assignor to Schramm, Inc., West Chester, Pa.

Filed Oct. 23, 1975, Ser. No. 624,747

Int. Cl.[2] B01F *3/04;* **C02C** *1/12*

U.S. Cl. 210—220 **24 Claims**



1. A system for treating sewage or liquid industrial waste by aeration comprising:

a lagoon for temporarily containing said sewage or liquid industrial waste during aeration thereof, said lagoon having a substantially flat bottom portion and at least one sloping side extending upwardly and outwardly from said bottom portion;

a plurality of air diffusers within said lagoon, located on and essentially confined to said bottom portion, each of said diffusers comprising an air manifold and at least four flexible diffuser tubes, each tube being connected to receive air from said manifold and to release said air in bubble form along substantially its entire length; the connections of said diffuser tubes to said manifold, all being projectable into a horizontal circle having a radius less than approximately one-tenth of the average length of said diffuser tubes, and said diffuser tubes extending substantially radially outwardly from said manifold in horizontal directions, there being at least one of said diffuser tubes in each quadrant; and

pumping means for supplying air to each manifold in the system;

said diffusers being arranged adjacent said sloping side, and at least two of the flexible tubes of each diffuser being arranged to diverge from each other in the direction from the manifold thereof toward said sloping side, whereby a resultant outwardly directed radial surface flow is produced above said sloping side.

12. A flexible air diffuser tube for aerating bodies of water such as reservoirs or sewage or waste treatment lagoons, comprising:

a flexible inner conduit connectable to receive air from a

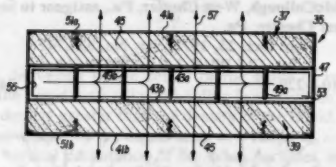
manifold, said inner conduit having perforations spaced along its length to release air to its exterior, a foraminous fabric tube surrounding said inner conduit and being of a size such as to provide a space at least between the perforations of said inner conduit and the interior of said fabric tube, means securing the ends of said fabric tube to said inner conduit in order to enclose the ends of said space so that escape of air from the fabric tube is essentially limited to the foramina thereof, and means comprising a quantity of loose pellets filling said space and providing resistance to the flow of air within said space.

4,048,073

FILTER BED ASSEMBLY

Lawrence J. Rose, Littleton, Colo., assignor to Helix Technology Corporation, Waltham, Mass.

Filed Mar. 1, 1976, Ser. No. 662,777
Int. Cl.[2] B01D *29/06*
U.S. Cl. 210—284 **9 Claims**



8. A filter bed assembly comprising:

a frame for defining a space through which fluids to be filtered flow;

first and second separate beds positioned in said space, said first and second separate beds each including an adsorbent material held between first and second parallel perforate sheets, said perforate sheets being attached along outer edges thereof to said frame, said first perforate sheets having first folded pleats therein, said first folded pleats extending approximately perpendicular to the plane of said first perforate sheets into said adsorbent material, said second perforate sheet having second folded pleats formed therein, said second folded pleats extending substantially perpendicular to the plane of said second perforate sheets away from said adsorbent material;

the perforate sheets of said first and second beds being attached to said frame to be parallel to one another with the respective second perforate sheets being adjacent one another but spaced from one another a distance approximately equal to the lengths of said second folded pleats, said second folded pleats contacting the second perforate sheets of the other respective beds to maintain said spacing.

4,048,074

APPARATUS FOR SEPARATING SOLIDS FROM LIQUIDS OR GAS

Hilmar Bruenemann, Ludwigshafen, and Guenter Stoeckelmann, Frankenthal, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Mar. 2, 1976, Ser. No. 663,209
Claims priority, application Germany, Mar. 14, 1975, 2511195
Int. Cl.[2] B01D *33/04*
U.S. Cl. 210—323 T **1 Claim**

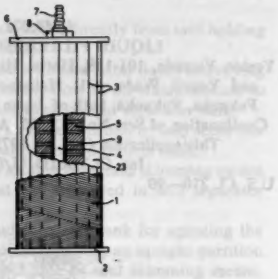
1. A filtration apparatus for separating solid particles from liquids or gases, said apparatus comprising:

a plurality of filter elements separated from each other by side walls which define separate segments of the filter apparatus;

each of said filter elements comprising a permeable hollow cylinder closed at both ends by end plates, at least one of said end plates having a feed orifice provided therein, and at least one layer of threads wound about said cylinder, said thread being connected at one of its ends to a take-up spool through a cleaning means;

a first support means rotatably mounting said filter elements and side walls;

a second fixed support means mounting feed lines and a rewinding drive whereby the relative movement of said first and second support means brings said feed lines and rewinding drive into engagement with said filter elements;



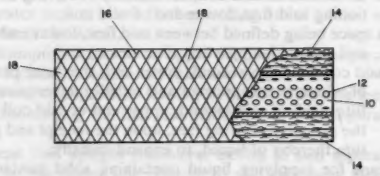
a plurality of separate discharge channels mounted on said second fixed support means, said discharge channels being in communication with each of said filter segments by means of collar mounted about said first rotatable support means and by means of central channel mounted at the axis of rotaion thereof whereby the liquids or solids leaving each of said filter elements are separately channeled away therefrom in accordance with the particular rotational position of said filter elements and filter segments.

4,048,075

FILTER CARTRIDGE

Floyd E. Colvin, and John E. Luttrell, both of Tell City, Ind., assignors to The Carborundum Company, Niagra Falls, N.Y.

Continuation of Ser. No. 467,433, May 6, 1974, abandoned, which is a continuation of Ser. No. 334,531, Feb. 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 185,621, Oct. 1, 1971, abandoned. This application Jan. 2, 1975, Ser. No. 537,974
Int. Cl.[2] B01D *27/00*
U.S. Cl. 210—484 **8 Claims**

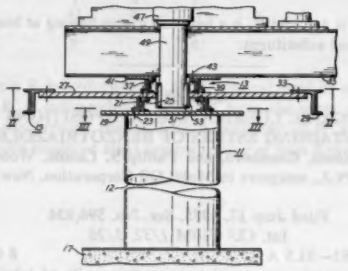


1. A filter cartridge for separating particles from fluid flowing inwardly through the cartridge, wherein the improvement consists essentially of: an inner tubular perforated core member; a pre-formed needle punched mat of non-woven unbonded fibrous filtering material having a width substantially equal to the length of said core member and wrapped in a continuous spiral layer around only said core member and itself, to form a roll of said mat; and a strand wound in a criss-cross open weave pattern around only the outer periphery of said roll and itself to form an open mesh network containing said roll.

4,048,076
CENTER COLUMN DRIVE ARRANGEMENT FOR CIRCULAR CLARIFIERS

Stephen G. Pearre, Essex, and Bobby L. Craighead, Baltimore, both of Md., assignors to Environmental Elements Corporation, Baltimore, Md.

Filed Dec. 29, 1975, Ser. No. 644,827
Int. Cl.² B01D *21/06*
U.S. Cl. 210—528 **4 Claims**



1. An improved circular clarifier apparatus of the type including a tank having a fixed center column and having connected to the center column a torque cage rotatable about the center column and a superstructure, wherein the improvement comprises:

a. a first bearing axially mounted to the top of the center column;

b. the torque cage mounted to the top of the first bearing and rotatable about the axis of the center column;

c. a second bearing axially mounted to the top of the torque cage and connected to the bottom of the superstructure;

d. drive means for rotating the torque cage, the drive means having a vertical drive shaft extending through the center of the second bearing and keyed to the torque cage.

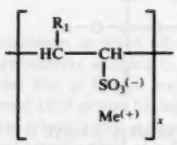
4,048,077
AQUEOUS CLAY BASE MUD FOR DEEP DRILLING

Friedrich Engelhardt, Frankfurt am Main; Martin Hille, Bad Soden, Taunus, and Dieter Ulmschneider, Konigstein, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

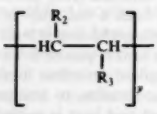
Filed Sept. 9, 1975, Ser. No. 611,616
Claims priority, application Germany, Sept. 14, 1974, 2444108
Int. Cl.² C09K *7/02*
U.S. Cl. 252—8.5 C **4 Claims**

1. An aqueous clay base mud containing per m^3 from about 0.5 to 40 kg of a protective colloid, the protective colloid contained in the mud being a copolymer which has a K-value of about 110 to 200 and which is constituted by the components of the formulae I, II and III

I

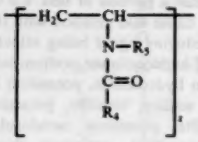


II



·Continued

III



in which R_1 and R_2 each is hydrogen or $-CH_3$; R_3 is $-CO-NH_2$, $-CN$ or $-COOCH_3$; R_4 is hydrogen, $-CH_3$ or $-C_2H_5$; R_5 is $-CH_3$ or $-C_2H_5$ or R_4 and R_5 together represent a propylene group forming a pyrrolidone radical with the inclusion of the radical

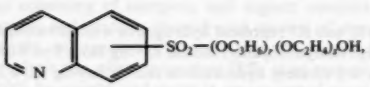
Me is ammonium, potassium, sodium or lithium and x is 5 to 50, y is 40 to 80 and z is 3 to 70, or by the alkaline hydrolysis products thereof and which contains the components in the parts by weight of the starting monomers indicated by the indices x, y and z.

4,048,078
OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed July 14, 1975, Ser. No. 595,652
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D **4 Claims**

1. A fluid which comprises about 20 to about 80 weight percent steam and about 80 to about 20 weight percent of air together with about 0.001 to about 0.02 weight percent of a solubilizing agent having the structural formula:



wherein r is an integer of from 3 to 10, s is an integer of from 5 to about 50 and wherein the sum of r plus s is not more than 55 and from about 0.001 to about 0.05 weight percent of an alkaline agent.

4,048,079
AQUEOUS GELS AND USES THEREOF

Richard L. Clampitt, and James E. Hessert, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 404,746, Oct. 9, 1973, Pat. No. 3,908,760. This application Aug. 6, 1975, Ser. No. 602,352
Int. Cl.² C09K *3/00*; B01J *13/00*
U.S. Cl. 252—8.55 D **15 Claims**

1. An aqueous gel, suitable for use in secondary recovery operations for the recovery of oil and in other oil field operations wherein subterranean formations are contacted with a fluid medium, said gel comprising water having incorporated therein:

a water-thickening amount of a biopolysaccharide produced by the action of bacteria of the genus Xanthomonas on a carbohydrate;

a water-soluble compound of chromium, wherein the valence of the chromium therein is +6 and is capable of being reduced to +3, in an amount which is sufficient to cause gelation of said water when the valence of at least a portion of said +6 chromium is reduced to +3; and

a water-soluble reducing agent in an amount which is effective to reduce at least a portion of said +6 chromium to +3 chromium and cause said gelation with the formation of said gel, said reducing agent being selected from the group consisting of hydroquinone, sodium sulfide, hydrogen sulfide, sodium hydrosulfite, potassium hydrosulfite, potassium sulfite, sodium bisulfite, potassium bisulfite, sodium metabisulfite, potassium metabisulfite, sodium sulfite, sodium thiosulfate, potassium thiosulfate, thioacetamide, p-hydrazinobenzoic acid, hydrazine phosphite, hydrazine dihydrochloride, and mixtures thereof.

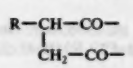
4,048,080

LUBRICATING OIL COMPOSITION

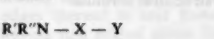
Gary D. Lee; Paul F. Vartanian, and Joseph B. Biasotti, all of Wappingers Falls, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 7, 1976, Ser. No. 693,458
Int. Cl.[2] C07D *41/00, 41/06*
U.S. Cl. 252—51.54 **14 Claims**

1. A lubricating oil composition comprising a major proportion of a base oil of lubricating viscosity and a minor dispersant amount of a reaction product prepared by the process which comprises reacting an alkenyl succinic acid or anhydride having the structural unit represented by the formula:



in which R is an alkenyl radical having a molecular weight ranging from about 250 to 3000 with an amine represented by the formula:



in which R′ and R″ represent hydrogen or a monovalent alkyl, aminoalkyl or hydroxyalkyl radical having from 1 to 8 carbon atoms, X is a divalent hydrocarbon radical having from 2 to 8 carbon atoms and Y is radical selected from the group consisting of hydrogen, amino, hydroxyl and a radical having the formula $O(R'''O)_xH$ in which R‴ is an alkylene radical having from 2 to 3 carbon atoms and x is an integer from 1 to 5, in the presence of a free radical initiator, the molar proportion of said amine to said succinic acid or anhydride being greater than one.

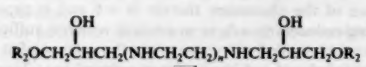
4,048,081

MULTIPURPOSE FUEL ADDITIVE

Warren H. Machleder, Blue Bell, and Joseph M. Bollinger, North Wales, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 536,074, Dec. 24, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,462
Int. Cl.[2] C10M *1/32*
U.S. Cl. 252—51.5 R **11 Claims**

1. A multipurpose gasoline or lubricating oil additive, comprising an adduct selected from compounds, and mixtures thereof, of the formulas:



and

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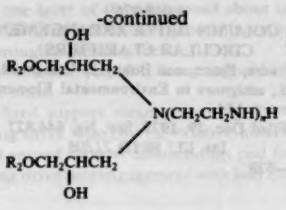


wherein n is 1–5 and R_2 is a benzene group having at least one polyalkylene substituent.

4,048,082

ORGANIC LUBRICATING COMPOSITIONS CONTAINING ESTERS OF BENZOTRIAZOLE

John C. Nnadi, Glassboro, and Phillip S. Landis, Woodbury, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed July 17, 1975, Ser. No. 596,934
Int. Cl.[2] C10M *1/32, 3/26*
U.S. Cl. 252—51.5 A **8 Claims**

1. An organic composition comprising oils of lubricating viscosity or greases prepared therefrom containing a minor anti-rust improving amount of an oil-soluble ester of an adduct of benzotriazole and an unsaturated dicarboxylic acid or anhydride thereof selected from the group consisting essentially of maleic anhydride, fumaric acid and acetylene dicarboxylic acid prepared by reacting said benzotriazole and said unsaturated dicarboxylic acid or anhydride thereof in a mole ratio of from about 0.5:1 to about 2:1 benzotriazole to acid or anhydride at a temperature of from about 80 to about 250° C and thereafter esterifying said adduct.

4,048,083

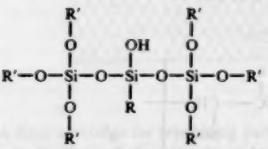
FUNCTIONAL FLUID SYSTEMS CONTAINING ALKOXYSILANOL CLUSTER COMPOUNDS

Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 616,439, Sept. 24, 1975, Pat. No. 3,965,135. This application Apr. 12, 1976, Ser. No. 675,881
The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.
Int. Cl.[2] C10M *3/46*
U.S. Cl. 252—78.3 **14 Claims**

1. In a method wherein a first mechanical effort is converted to pressure at a first location, the pressure is transmitted from said first location to a second location via a hydraulic fluid, and said pressure is converted to a second mechanical effort at said second location, the improvement which comprises using as said hydraulic fluid one which comprises an effective amount of a compound having the formula:

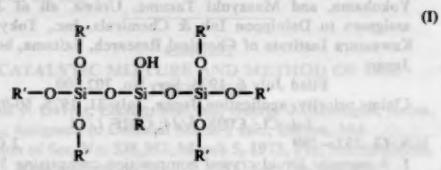
(I)



wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

8. In a method wherein heat is passed from a first heat conductor to a heat transfer fluid at a first location, the heat is transmitted from said first location to a second location, via said heat transfer fluid and said heat is passed from said heat

transfer fluid to a second heat conductor at said second location, the improvement which comprises using as said heat transfer fluid one which comprises an effective amount of a compound having the formula:



(I)

wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

4,048,084

FUNCTIONAL FLUID SYSTEMS CONTAINING ALKOXYSILANE CLUSTER COMPOUNDS

Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

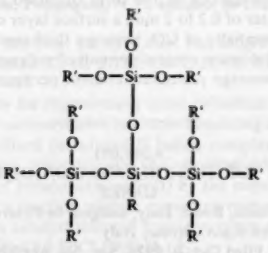
Continuation-in-part of Ser. No. 616,438, Sept. 24, 1975, Pat. No. 3,965,136. This application Apr. 12, 1976, Ser. No. 675,882

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² C10M *3/46*

U.S. Cl. 252—78.3 **14 Claims**

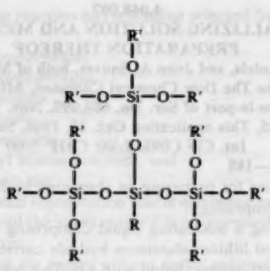
1. In a method wherein a first mechanical effort is converted to pressure at a first location, the pressure is transmitted from said first location to a second location via a hydraulic fluid, and said pressure is converted to a second mechanical effort at said second location, the improvement which comprises using as said hydraulic fluid one which comprises an effective amount of a compound having the formula:



(I)

wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

8. In a method wherein heat is passed from a first heat conductor to a heat transfer fluid at a first location, the heat is transmitted from said first location to a second location via said heat transfer fluid, and said heat is passed from said heat transfer fluid to a second heat conductor at said second location, the improvement which comprises using as said heat transfer fluid one which comprises an effective amount of a compound having the formula:



(I)

wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

4,048,085

PREPARATION OF DETERGENT COMPOSITIONS

Robin Snell Heslam, Wallasey, England, assignor to Lever Bros. Co., New York, N.Y.

Filed Apr. 19, 1976, Ser. No. 678,270

Claims priority, application United Kingdom, Apr. 18, 1975, 16147/75

Int. Cl.² C11D *7/54, 7/60, 7/32*

U.S. Cl. 252—102 **7 Claims**

1. A process for preparing a detergent powder composition comprising the steps of forming an alkaline aqueous slurry having a pH value (measured on a 1% solids solution) of about 8.5 to 12 and comprising a surface-active agent selected from the group consisting of anionic, nonionic, zwitterionic, amphoteric and cationic detergents and mixtures thereof in an amount of about 1–20% by weight; a builder salt selected from the group consisting of inorganic and organic complex-forming substances and mixtures thereof in an amount of about 5–40% by weight, an organic activator for peroxy compounds having a hydrolysis rate of not more than 15%, in an amount of about 0.2–10% by weight; and water in an amount of about 40–60% by weight, heating said aqueous slurry to a temperature of about 60°–90° C, and subjecting it to a spray-drying operation to form a particulate detergent composition having the organic activator homogeneously distributed therein.

4,048,086

COBALTIC ACCELERATORS WITH GROUP II METAL OXIDES AND HYDROXIDES

Melville W. Uffner, Glen Mills, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed June 3, 1975, Ser. No. 583,500

Int. Cl.² C08G *63/12*

U.S. Cl. 252—182 **7 Claims**

1. An accelerator composition suited for providing extended shelf life to sheet and bulk molding compound while providing accelerated cure rates at molding temperatures which comprises in combination:

a cobaltic promotor selected from the group consisting of cobaltic halides, cobaltic salts of monocarboxylic acids having from two to 20 carbon atoms, cobaltic sulfate, and cobaltic beta-diketones; and

from about 1 to 4,500 parts, per part of cobaltic metal in said cobaltic promotor, of a coupler containing either calcium or magnesium.

4,048,087

CRYSTALLIZING SOLUTION AND METHOD OF PREPARATION THEREOF

Roger D. Daniels, and John A. Snover, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 684,099, Nov. 15, 1967, Pat. No. 3,819,335. This application Oct. 23, 1968, Ser. No. 770,127

Int. Cl.[2] C09K *3/00;* C01F *7/00*

U.S. Cl. 252—188 13 Claims

1. A process for preparing an aluminum hydride crystallizing liquid comprising:

a. providing a nucleating liquid comprising aluminum hydride and lithium aluminum hydride carried in a mixture of an inert organic liquid with a boiling point greater than about 60° C. and an aliphatic ether having a lower boiling point than the inert organic liquid, said aluminum hydride and lithium aluminum hydride being present in sufficient quantities so that the concentration of aluminum hydride in the nucleating liquid is within the range of about 0.05 to about 1 molar, and the aluminum hydride/lithium aluminum hydride mole ratio is within the range from about 2 to about 10, said ether being present in a sufficient amount to maintain the aluminum hydride in solution,

b. providing a bath or organic liquid heated to a volatilization temperature,

c. introducing said nucleating liquid into said heated organic liquid thereby to form a pre-crystallizing bath while maintaining the temperature of the pre-crystallizing bath at or above said volatilizing temperature, and

d. continuing to introduce said nucleating liquid into the pre-crystallizing bath and maintaining the temperature of the bath at or above the volatilization temperature until crystals of aluminum hydride form in the pre-crystallizing bath.

4,048,088

NEMATIC LIQUID CRYSTAL COMPOSITIONS

Mashachika Yaguchi, Yokohama, and Kenji Nakamura, Kamakura, both of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 501,923, Aug. 30, 1974, Pat. No. 3,989,639. This application Apr. 23, 1976, Ser. No. 679,586

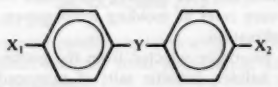
Claims priority, application Japan, Aug. 31, 1973, 48-97216; Aug. 31, 1973, 48-97217

Int. Cl.[2] C09K *3/34;* G02F *1/13*

U.S. Cl. 252—299 10 Claims

1. A nematic liquid crystal composition with positive dielectric anisotropy which comprises a mixture of 2 to 50% by weight of at least one of compounds represented by the formula,

I



wherein X_1 is halogen or a nitro group, X_2 is hydrogen or —R or —OR radicals wherein R is an alkyl group of 1 to 18 carbon atoms, and Y is —N=N— and 50 to 98% by weight of a nematic liquid crystal material.

4,048,089

NEMATIC LIQUID CRYSTAL COMPOSITION

Yoshi Arai, Oyama; Kazuo Kimura, Tokyo; Hisato Sato, Tokyo; Takasi Yamaki, Tokyo; Katsuhiko Morita; Masanao Ohzeki, both of Urawa; Haruyoshi Takatsu, Kodaira; Yutaka Fujita, Yokohama, and Masayuki Tazume, Urawa, all of Japan, assignors to Dainippon Ink & Chemicals, Inc., Tokyo and Kawamura Institute of Chemical Research, Saitama, both of Japan

Filed July 6, 1976, Ser. No. 702,500

Claims priority, application Japan, July 31, 1975, 50-92571

Int. Cl.[2] C09K *3/34;* G02F *1/13*

U.S. Cl. 252—299 2 Claims

1. A nematic liquid crystal composition comprising 5 to 70 mole% of (I) 4-n-valeryloxy-4'-cyanobiphenyl, 5 to 40 mole% of (II) 4-n-caproyloxy-4'-cyanobiphenyl, 5 to 60 mole% of (III) 4'-cyanophenyl-4-n-heptylbenzoate, and 5 to 45 mole% of (IV)4'-cyanophenyl-4-n-butylbenzoate.

4,048,090

REACTOR FUEL IN THE FORM OF MIXED OXIDE PARTICLES AND A METHOD FOR MANUFACTURING SUCH MIXED OXIDE PARTICLES

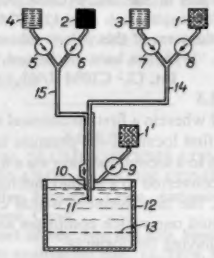
Kare Hannerz, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Dec. 4, 1975, Ser. No. 637,635

Claims priority, application Sweden, Dec. 5, 1974, 7415226

Int. Cl.[2] G21C *3/62*

U.S. Cl. 252—301.1 R 6 Claims



1. Mixed oxide fuel consisting essentially of uranium dioxide and plutonium dioxide in the form of mixed oxide particles with a diameter of 0.2 to 2 mm, a surface layer of the particles consisting essentially of UO_2 having a thickness of at lest 0.05 mm with a plutonium content per unit of volume of at the most 15% of the average plutonium content per unit of volume of the particle.

4,048,091

PROCESS FOR THE PREPARATION OF REDUCING GASES

Pierluigi Barnaba, Rome, Italy, assignor to Centro Sperimentale Metallurgico S.p.A., Rome, Italy

Filed Oct. 9, 1975, Ser. No. 621,229

Claims priority, application Italy, Oct. 11, 1974, 53486/74

Int. Cl.[2] C07C *2/14, 2/16*

U.S. Cl. 252—373 1 Claim

1. A process for the production of reducing gases having a high content of CO and H_2, comprising, in a first stage, partially combusting methane with a gas containing 20 to 100% by volume oxygen, the molar ratio of oxygen in the oxygen-containing gas to methane being between 0.60 and 0.75, and, in a second stage converting the gas from said first stage on a catalytic bed of porous alumina or magnesia and then on a catalytic bed of nickel oxide supported on porous alumina or magnesia, at a temperature between 900° and 1500° C, by adding further methane such that the oxygen in the oxygen-containing gas of said first stage has a molar ratio to the initial

first stage methane and added second stage methane which is about 0.5, while the uncombusted methane from the first stage plus the added methane in the second stage has a molar ratio to the H_2O plus CO_2 in the gases from the first stage which is between 0.8 and 1.

4,048,092

CATALYTIC MIXTURE AND METHOD OF USE THEREFOR

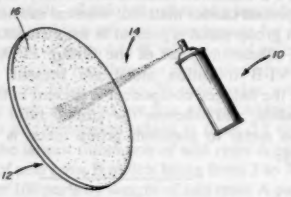
Ronald F. Davies, Elkton, Md., and George J. Benvegno, Aston, Pa., assignors to Colonial Metals, Inc., Elkton, Md.

Division of Ser. No. 338,352, March 5, 1973, Pat. No. 3,915,350. This application Sept. 2, 1975, Ser. No. 609,494

The portion of the term of this patent subsequent to Sept. 10, 1991, has been disclaimed.

Int. Cl.[2] B01D *15/06*

U.S. Cl. 252—412 **7 Claims**



1. A method of rejuvenating a spent catalyst-coated surface, comprising the steps of:

applying to said surface an aqueous composition selected from the group consisting of (1) chloroplatinic acid, a high surface refractory, dextrose, and triethanolamine, (2) chloroplatinic acid and sodium citrate, (3) ammonium chloroplatinite and dimethyl form amide; and

heating the applied mixture, whereby a catalyst which has lost its catalytic activity in service may be rejuvenated.

4,048,093

PROCESSES FOR REGENERATING DISPERSIONS OF LIGAND-STABILIZED, PALLADIUM(II) HALIDE COMPLEXES USED IN CARBONYLATION CATALYSTS

John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 635,995

Int. Cl.[2] B01J *31/40, 27/32;* **C07C** *51/00;* **C11C** *3/02*

U.S. Cl. 252—414 **2 Claims**

1. A process for regenerating spent palladium catalysts utilized in olefin carbonylation reactions consisting of dispersions of ligand-stabilized palladium(II) halide complexes in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) and trihalogermanate(II) by the steps of:

a. Forming a reaction mixture consisting essentially of spent palladium catalyst selected from the group consisting of:

$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$,
$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}Ch_3.C_6H_4)_3]_2$,
$[ClCH_2(C_2H_5)_3P][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$,
$[(n\text{-}C_4H_9)_4N][SnCl_3]$-$PdCl_2[P(C_6H_5)_3])_2$,
$[(C_6H_5)_4As][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$,
$[(C_2H_5)_4N][GeCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$,
$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}CH_3O.C_6H_4)_3]_2$, and
$[(C_7H_{15})_4N][GeCl_3]$-$PdCl_2[As(C_6H_5)_3]_2$,

with organic peroxide in the mole ratio of 1 to 10^4 mole of organic peroxide per gram atom of palladium present in the spent catalyst, and in the presence of dry inert solvent selected from the group consisting of unsubstituted aromatic hydrocarbons, unsubstituted paraffins, chlorinated paraffins, chlorinated aromatic hydrocarbons, ketones and sulfones and inert gaseous environment, until a reaction mixture is formed, said organic peroxide in the reaction mixture being selected from the group consisting of:

t-butyl hydroperoxide,
dumene hydroperoxide,
benzoyl peroxide,
acetyl peroxide,
di-t-butyl peroxide,
methyl ethyl ketone peroxide, and
dicumyl peroxide;

b. Heating said regeneration reaction mixture between 20° to 150° C until the spent catalyst is regenerated in said reaction mixture,

c. Removing the excess solvent under reduced pressure,

d. Adding additional stabilizing ligand selected from the group consisting of triphenylphosphine, triphenylarsine, and tri-p-methoxyphenylphosphine to the solid catalyst in the mole ratio of 1–10 mole of ligand per gram atom of palladium present, and

e. Recycling the regenerated catalyst with fresh olefin feed back to the carbonylation reaction.

4,048,094

REACTIVATION OF HYDROTREATING CATALYST BY OPERATING AT A TEMPERATURE IN EXCESS OF NORMAL OPERATING TEMPERATURE

Roland L. Menzl, Hammond, Ind., and P. Donald Hopkins, St. Charles, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 527,827, Nov. 27, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,716

Int. Cl.[2] B01J *23/94;* **C10G** *43/02, 23/02*

U.S. Cl. 252—414 **3 Claims**

1. A process for the reactivation of deactivated catalyst used in the hydrotreating of a hydrocarbon feedstream, which hydrotreating is conducted within a temperature range from about 500° F. to about 800° F. and a hydrogen partial pressure within the range from about 500 to about 2500 psia, wherein the catalyst comprises a Group VIa and Group VIII metal on a solid porous refractory oxide support of alumina having a pore diameter greater than about 80 A. and up to about 250 A, and wherein said feedstream comprises unfinished petroleum crude scale wax, which process comprises first contacting said catalyst with a mixture of steam containing about 0.2 to about 4 volume percent oxygen at a temperature of about 750° F. to about 1050° F. in a conventional air-steam catalyst regeneration, and then contacting said catalyst with said hydrogen and feedstream at a temperature from about 25° F. to about 200° F. in excess of the normal operating temperature that would be used for said hydrotreating stream, said contacting being conducted for a time that is sufficient to reactivate said catalyst.

4,048,095

ANTIMONY HALIDE CATALYST SYSTEM

Ronald Thomas Wojcik, Stamford, and Erwin Richard Ruckel, Darien, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.

Division of Ser. No. 654,687, Feb. 3, 1976, Pat. No. 4,016,346. This application May 12, 1976, Ser. No. 685,471

Int. Cl.[2] C08F *4/12, 4/20*

U.S. Cl. 252—429 R **2 Claims**

1. A catalyst system adapted for use in carbocationic polymerization which consists essentially of (1) from 30% to 10% of an antimony halide and (2) from 70% to 85% of aluminum chloride or aluminum bromide or mixtures of the latter.

2. The catalyst system according to claim 1 wherein an amount ranging from 0% to 5% of adjuvant selected from the group consisting of lower alkyl halide, lower alkenyl halide and aralkyl halide is included.

4,048,096

SURFACE IMPREGNATED CATALYST

Thomas Charles Bissot, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 12, 1976, Ser. No. 675,766
Int. Cl.[2] B01J *31/04*
U.S. Cl. 252—430 19 Claims

14. A catalyst having a specific activity of at least about 83 grams of vinyl acetate per gram of precious metal per hour measured at 150° C. consisting essentially of

1. a catalyst support having a particle diameter of from about 3 to about 7 mm, and a pore volume of from about 0.2 to about 1.5 mlg, a 10% by weight water suspension of said support having a pH of from about 3.0 to about 9.0,
2. a palladium-gold alloy distributed in a surface layer of said support, said surface layer extending less than about 0.5 mm from the surface of said support, the palladium in said alloy being present in an amount of from about 1.5 to about 5.0 grams per liter of catalyst, the gold being present in an amount of from about 0.5 to about 2.25 grams per liter of catalyst and
3. from about 5 to about 60 grams per liter of catalyst of alkali metal acetate.

4,048,097

SULFONATED METAL PHTHALOCYANINE CATALYST

Walter M. Douglas, Streamwood, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 19, 1976, Ser. No. 659,394
Int. Cl.[2] B01J *31/18*
U.S. Cl. 252—431 N 5 Claims

1. A metal phthalocyanine composition of matter prepared by reacting a 4-sulfophthalic acid or salt thereof, a Group VIII metal salt, an ammonium donor compound decomposable to ammonia or ammonium moiety, and water, at a temperature of 255° to 325° C. for ½ to 10 hours.

4,048,098

CATALYST FOR PURIFICATION OF EXHAUST GASES AND PROCESSES FOR ITS PRODUCTION AND USE

Edgar Koberstein, Alzenau, and Eduard Lakatos, Rhinefelden, Baden, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Feb. 4, 1974, Ser. No. 439,174
Claims priority, application Germany, Feb. 9, 1973, 2306395
Int. Cl.[2] B01J *21/00, 21/04, 21/08, 21/12, 23/64, 23/74*
U.S. Cl. 252—432 54 Claims

1. A carrier catalyst comprising an intermetallic system of at least three metals as catalytically active component, said catalyst comprising the product obtained by contacting a catalyst carrier with an aqueous solution comprising a halide of at least one metal selected from the group consisting of (a) rhodium, palladium and platinum, and a halide of at least one base metal selected from the group consisting of (b) aluminum, titanium, chromium, manganese, cobalt and nickel; drying the resulting impregnated carrier; and reducing the halides at a temperature of about 450°–1000° C in a stream of hydrogen; wherein said group (a) metals and said group (b) metals are in an atomic ratio of group (a) metals to group (b) metals of about 1 : 4 to 1 : 1; provided that, when said system contains platinum, rhodium and at least one of said base metals, said atomic ratio is 1 : 4 to 1 : 2.4.

4,048,099

HYDROCARBON CONVERSION WITH AN ACIDIC TRIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 442,714, Feb. 14, 1974, Pat. No. 3,928,177, which is a continuation-in-part of Ser. No. 216,739, Jan. 10, 1972, Pat. No. 3,806,446, which is a division of Ser. No. 17,886, March 9, 1970, abandoned. This application Sept. 22, 1975, Ser. No. 615,647
Int. Cl.[2] B01J *27/06, 27/02;* C10G *35/06*
U.S. Cl. 252—441 15 Claims

1. An acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % Group IV-A metal, about 0.01 to about 3 wt. % Group VI-B transition metal and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, Group IV-A metal and Group VI-B transition metal are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the Group IV-A metal and the Group VI-B transition metal are present in oxide form; wherein the halogen component is present in the form of combined halide, and wherein the atomic ratio of Group VI-B transition metal to platinum group metal is about 0.05:1 to about 4:1.

4,048,100

POLYHALOGENATED POLYOLS AND FOAMED POLYURETHANES PREPARED FROM THEM

Arthur E. Gurgiolo, and Llewellyn D. Booth, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 462,143, April 18, 1974, abandoned. This application July 14, 1975, Ser. No. 595,972
Int. Cl.[2] C08G *18/14*
U.S. Cl. 260—2.5 AJ 12 Claims

1. A semi-rigid to rigid foamed polyurethane product having predominantly closed cells which comprises the reaction product of

1. a polyol having the formula

$$(Q)_a\text{—}N(R)_b\text{—}[(CH_2)_cN(Q)]_d(CH_2)_cOH$$

wherein Q is 3-polyhalophenoxy-2-hydroxypropyl; R is $\text{—}(CH_2)_cOH$ or $\text{—}(CH_2)_cCH_3$; *a* is 1 or 2; *b* is 0 or 1; *c* is 2–4 and *d* is 0 or 1 with the proviso that when *a* is 2, *b* is 0 and halo is bromine or chlorine,

2. an aryl polyisocyanate,
3. a polyurethane blowing agent, and
4. a surfactant,

wherein said polyisocyanate is used in amounts corresponding to from 0.9 to 2.0 NCO groups for each active hydrogen atom in the mixture of reactive materials.

4,048,101

PROCESS FOR PREPARING A FOAMED BODY HAVING AN ANNULAR RING PATTERN IN CROSS-SECTION

Akio Nakamachi, and Zenichi Maruo, both of Sakai, Japan, assignors to Daicel Ltd., Osaka, Japan

Filed Dec. 22, 1975, Ser. No. 643,138
Claims priority, application Japan, Dec. 27, 1974, 50-3632
Int. Cl.[2] C08J *9/20*
U.S. Cl. 260—2.5 E 6 Claims

1. A process for preparing a foamed molding having an annual ring pattern in cross-section, which comprises the steps of:

I. dry blending particles of a first styrene resin A having a

particle size in the range of from 10 to 150 mesh, with additives consisting essentially of

1. from 0.1 to 5 parts by weight, per 100 parts by weight of said resin A, of an organic, heat-decomposable, solid, gas-releasing foaming agent having a decomposition temperature of from 150° to 120° C,
2. from 0.1 to 5 parts by weight, per 100 parts by weight of said resin A, of a foaming assistant effective for controlling the decomposition temperature of said foaming agent,
3. from 0.1 to 5 parts by weight, per 100 parts by weight of said resin A, of a finely divided, inert, inorganic substance effective for forming pore nuclei in said resin A during foaming thereof, and
4. a dry colorant, for altering the normal color of said resin A,

whereby to coat the particles of resin A with said additives;

II. dry blending with the product of step I, a substance consisting essentially of colored pellets of a second styrene resin B colored within a colorant or colorants for altering the normal color of said resin B wherein said resin B has a melt index which is less than the melt index of said resin A by a value of from one to 20 melt index units and wherein said resin B pellets are free of said additives and have at least one dimension which is from 0.5 to 7 mm larger than the largest dimension of said resin A particles, the amount of said resin B pellets being from 5 to 70 parts by weight per 100 parts by weight of said resin A particles, said resin B pellets being colored with a color or colors different from that of said dry colorant for said resin A;

III. placing the product of step II in a molding machine and therein heating and mixing the product of step II by screw means to form a hot, viscous, molten, molding composition consisting essentially of a resin A phase and a resin B phase and in which said additives are present primarily in the resin A phase and said foaming agent is partially decomposed, and then passing the molding composition through an orifice into a zone of lower pressure wherein the molding composition expands to form a foamed molding, wherein the ratio of the volume of the molten molding composition prior to molding : the volume of the foamed molding is from 1:1.1 to 1:3, said foamed molding having in cross-section an annular ring pattern consisting essentially of layers of foamed resin A and substantially unfoamed resin B.

4,048,102

PROCESS FOR PREPARING FLEXIBLE POLYURETHANE FOAMS

Billy Quock, Richwood; Don Howard Kelley, Lake Jackson, and Sehon Lester Warneke, Brazoria, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 569,904, April 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 507,893, Sept. 20, 1974, abandoned, and a continuation-in-part of Ser. No. 634,674, Nov. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 570,336, April 21, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,768

Int. Cl.[2] C08G *18/06, 18/14, 18/28*

U.S. Cl. 260—2.5 AM **22 Claims**

1. A process for preparing flexible polyurethane foam having a modulus of at least about 2.3 which comprises subjecting to foaming conditions, a composition comprising:

A. 1. from about 50 to 100 percent by weight of a primary, hydroxyl-containing polyether triol having an average hydroxyl equivalent weight of from about 900 to about 2500,

2. from 0 to about 50 percent by weight of a polyol selected from a diol, a triol, a polymer-containing diol, a polymer-containing triol or mixtures thereof wherein said diols and triols have an average hydroxyl equivalent weight of from about 500 to about 2500 and said polymer has an average molecular weight of at least about 5000;

B. an organic polyisocyanate consisting of

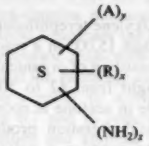
1. from about 50% to 100% by weight of 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, NCO-containing prepolymers thereof, and
2. from 0 to about 50% by weight of an organic polyisocyanate having an average NCO functionality of at least 2;

C. from about 1.0 to about 5 parts by weight of water per 100 parts by weight of Component (A);

D. from about 0 to about 20 parts of a low boiling auxiliary blowing agent per 100 parts by weight of Component (A);

E. from about 0.1 to about 10 parts per 100 parts by weight of Component (A) of a crosslinker composition consisting essentially of

1. from 5 to 100 percent by weight of compounds or mixtures of compounds represented by the formula



wherein A is represented by the group

each R, R_1 and R_2 are independently hydrogen or an alkyl group having from 1 to about 4 carbon atoms, *x* has a value from zero to about 4; *y* has a value of 1 or 2; *z* has a value of zero or 1, and when *y* is 2, *z* is zero and the sum of *y* and *z* is 2, as a primary crosslinker component, and

2. from 0 to about 95 percent by weight of an auxiliary crosslinker component;

F. from about 0.5 to about 4 parts by weight per 100 parts by weight of Component (A) of a catalyst for the urethane reaction;

G. from abut 0.005 to about 2.5 parts by weight per 100 parts by weight of Component (A) of a silicone oil cell control agent;

and wherein Components (A), (B), (C) and (E) are present in quantities so as to provide an NCO:active hydrogen equivalent ratio of from about 0.8:1.0 to about 1.3:1.0.

4,048,103

COMPOSITION BASED ON PHENOLIC RESIN, POLYISOCYANATE, AND PETROLEUM OIL

Joseph Graham, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 9, 1976, Ser. No. 656,536

Int. Cl.[2] C08J *9/00*

U.S. Cl. 260—2.5 B **29 Claims**

1. A curable composition of matter comprising

a. an oil-soluble phenolic resin;

b. polyisocyanate carrying on the average at least two isocyanate groups per molecule capable of reacting with hydroxyl groups on said phenolic resin to form a cured reaction product;

c. a catalyst that promotes reaction between said isocyanate and hydroxyl groups; and

d. petroleum oil comprising a blend of aromatic and paraffinic oils and included in an amount sufficient to dissolve said phenolic resin, polyisocyanate, and catalyst to a flowable form; the petroleum oil separating from said reaction product during the course of reaction as a uniform disper-

sion of minute droplets entrapped within the reaction product.

4,048,104

POLYISOCYANATE PREPOLYMERS FROM SCRAP POLYESTER AND POLYURETHANE FOAM PRODUCTS OBTAINED THEREFROM

Glenn R. Svoboda, Grafton; John T. Suh, Mequon; William L. Carlstrom, and Gary L. Maechtle, both of West Bend, all of Wis., assignors to Freeman Chemical Corporation, Port Washington, Wis.

Filed Aug. 5, 1976, Ser. No. 711,831
Int. Cl.² C08G *18/14, 63/76;* C08J *11/04;* C08G *18/10*
U.S. Cl. 260—2.5 AN **14 Claims**

1. The method of preparing a polyisocyanate prepolymer comprising

A. Digesting polyalkylene terephthalate having a molecular weight greater than 15,000 in a reactive solvent selected from the class consisting of organic diols and triols having a molecular weight from 62 to 500 until the digestion product is soluble in acetone at room temperature;

B. Reacting the said digestion product with an organic polyisocyanate to produce a polyisocyanate-terminated prepolymer substantially free of unreacted hydroxyl radicals.

4,048,105

HIGH DENSITY URETHANE FOAM FOR RIM

Wayne C. Salisbury, Middleton, N.H., assignor to McCord Corporation, Detroit, Mich.

Filed Dec. 19, 1975, Ser. No. 642,559
Int. Cl.² C08J *9/00*
U.S. Cl. 260—2.5 AC **6 Claims**

1. A polyurethane foam prepared by intimately mixing

A. a polyol blend comprising (parts by weight):

long chain polyol	50 to 100
cross linker/extender	0 to 25
aromatic polyamine	1 to 6
alkylene amine catalyst	0.01 to 3.0
organometal catalyst	0.01 to 0.05

with

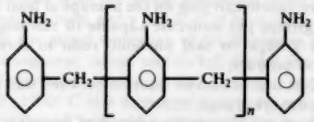
B. a quasi prepolymer of an alkane diol and an aromatic diisocyanate, said quasi prepolymer having a free NCO in the range of 20 to 27 percent;

wherein:

said long chain polyol has a molecular weight in the range of 3000 to 6000, a functionality in the range of 2 to 3, and an equivalent weight of 1500 to 3000:

said crosslinker/extender has a molecular weight in the range of 62 to 250 and is selected from the group consisting of alkane diols and triols;

said aromatic polyamine has the formula



and n has the value in the range of 0.1 to 0.7, and

said polyol blend and said quasi prepolymer are admixed to an Index in the range of 98 to 106.

4,048,106

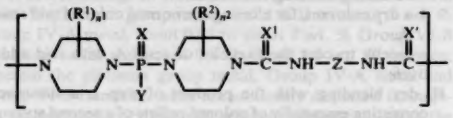
NOVEL POLYUREAS PREPARED BY REACTION OF A DIAMINE WITH A DIISOCYANATE OR A DIISOTHIOCYANATE

Johny C. Hermans, Wespelaar, Belgium, assignor to s.a. Texaco Belgium n.v., Brussels, Belgium

Filed Nov. 3, 1975, Ser. No. 628,263
Claims priority, application United Kingdom, May 21, 1975, 21772/75
Int. Cl.² C08G *18/14, 18/32, 18/38*
U.S. Cl. 260—2.5 AV **13 Claims**

1. Polyureas containing repeating groups of the formula

I



X is absent or represents an oxygen or sulphur atom or a group of the formula = N—R in which R represents an aliphatic, cycloaliphatic or aromatic group or a heterocyclic group;

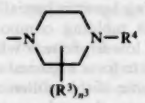
X' represents an oxygen or sulphur atom;

Y represents an aliphatic, cycloaliphatic or aromatic hydrocarbon group or heterocyclic group;

a group of the formula —NR_2 wherein R has the meaning given above or wherein the two groups R and the nitrogen atom to which they are attached together represent a N-containing heterocyclic ring;

a group of the formula —OR in which R has the meaning given above; or a group of the formula

II



R^1, R^2, R^3 and R^4 each represent a substituent on the piperazine ring said substituents R^1, R^2 and R^3 containing no active hydrogen atoms reactive with isocyanate or isothiocyanate groups, and substituent R^4 being hydrogen or a substituted or unsubstituted aliphatic, cycloaliphatic or aromatic hydrocarbon group, a heterocyclic group, an acyl group, a sulphonyl group, or a substituted carbamoyl group, —CO—NHR, wherein R has the meaning give above,

n^1, n^2 and n^3, which may be the same or different each represents O or an integer; and

Z represents the residue obtained by removal of the NCO or NCS groups from an organic diisocyanate or diisothiocyanate.

4,048,107

POLYURETHANE FOAM PREPARATION USING AMINO ACETAL CATALYST

John S. Babiec, Jr., Orange; Steven T. Nakos, Wallingford, and Stephen L. Goldstein, Cheshire, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 12, 1976, Ser. No. 648,451
Int. Cl.² C08G *18/18*
U.S. Cl. 260—2.5 AC **17 Claims**

1. A process for preparing a polyurethane foam from a reaction mixture which comprises an organic polyisocyanate, a polyol, a foaming agent and a catalytic proportion of an amino acetal catalyst selected from the group consisting of:

1,1-bis(2-dimethylaminoethoxy)ethane,

bis(2-dimethylaminoethoxy)methane,

1,1-bis(2-dimethylaminoethoxy)propane, and
1,1,2,2-tetrakis(2-dimethylaminoethoxy)ethane.

4,048,108

OLIGOMERIZATION PROCESS AND CATALYST THEREFOR

Ji-Yong Ryu, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 645,116
Int. Cl.[2] B01J *27/12*
U.S. Cl. 252—442 8 Claims

1. A catalyst preparation method which comprises heating a metal oxide which possesses surface hydroxyl groups with hydrogen or nitrogen at a temperature of from about 350° to about 550° C., impregnating the thus heated metal oxide with a solution of titanium tetrafluoride, cold rolling the impregnated oxide for a time period of from about 0.5 to about 4 hours, then steam drying at about 100° C. and further drying at about 200°–600° C. in an inert atmosphere.

4,048,109

OLIGOMERIZATION PROCESS AND CATALYSTS THEREFOR

Ji-Yong Ryu, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 645,118
Int. Cl.[2] B01J *27/10*
U.S. Cl. 252—442 10 Claims

1. A catalyst preparation method which comprises heating a metal oxide having surface hydroxyl groups at a temperature in the range from about 400° to about 600° C., thereafter contacting the metal oxide with titanium tetrachloride vapor in a series of steps at progressively higher temperatures within the range of from about 50° to about 600° C. to deposit titanium tetrachloride on the metal oxide, and then heating the impregnated metal oxide in contact wth hydrogen gas at a temperature in excess of 300° C. up to about 700° C. to reduce the titanium to a valence state of less than +4.

4,048,110

RHENIUM CATALYST COMPOSITION

Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed May 12, 1976, Ser. No. 685,596
Int. Cl.[2] B01J *27/20, 31/12*
U.S. Cl. 252—443 10 Claims

1. A rhenium containing catalyst composition prepared by thermally decomposing a rhenium-containing compound having the initial structure selected from at least one member of the group consisting of $Re_2(CO)_{10}$, $[\pi\text{-}C_5H_5(CO)_3]$, $\pi\text{-}C_5H_5Re(CO)_3\pi\text{-}(C_5H_5)_2ReH$, $C_{10}H_{11}Re(CO)_2$and $ReR(CO)_5$ wherein R is a radical selected from the group consisting of phenyl, methyl and perfluropropyl, to an extent sufficient to provide a pluraltiy of coordination vacancies on the surface thereeof which are capable of inducing the selective conversion of alpha, beta-ethylenically unsaturated aldehydes, to alpha, beta-ethylenically unsaturated alcohols which thermal decompositions is achieved by

a. adsorbing said rhenium-containing compounds on the surface of a catalyst support, having a plurality of pores with an average pore diameter of at least 40 A,
b. heating the catalyst support having the rhenium-containing compounds adsorbed thereon at a temperature of about 125° C to 325° C in the presence of a hydrogen-containing gas while maintaining a positive pressure.

4. The rhenium catalyst composition of claim 1 wherein the rhenium-containing compound which is thermally decomposed is $RE_2(CO)_{10}$.

4,048,111

METHOD FOR MANUFACTURING AN ADSORBENT USEFUL FOR OLEFIN SEPARATION

Donald H. Rosback, Elmhurst, and Richard W. Neuzil, Downers Grove, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 586,446, June 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 317,861, Dec. 12, 1972, Pat. No. 3,929,669. This application June 7, 1976, Ser. No. 693,656
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.[2] B01J *29/06*
U.S. Cl. 252—455 Z 8 Claims

1. A method for the production of improved adsorbent particles having increased capacity for olefins and decreased catalytic activity from a precursor mass comprising sodium Y zeolite having a Na_2O/Al_2O_3 ratio less than about 0.7 and amorphous material selected from the group consisting of silica, alumina and slica-alumina mixtures and silica-alumina compounds which method comprises the steps of:

a. contacting said precursor mass with an aqueous sodium hydroxide solution at ion exchange conditions to increase the sodium cation content to a Na_2O/Al_2O_3 ratio of greater than about 0.7 and to remove from about 1 to about 15 wt. % silica and alumina from the precursor mass;
b. washing said mass with water to remove therefrom excess sodium hydroxide; and,
c. at least partially dehydrating said mass at dehydrating conditions.

4,048,112

CATALYST FOR SELECTIVE REDUCTION OF NITROGEN OXIDES

Kunichi Matsushita, Kawasaki; Hikaru Sakurada, Yokohama; Kazuhiko Onuma, and Shinichi Fujii, both of Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 504,824, Sept. 10, 1974, abandoned. This application May 12, 1976, Ser. No. 685,920
Claims priority, application Japan, Sept. 10, 1973, 48-101975; Oct. 9, 1973, 48-113620; Oct. 11, 1973, 48-114134; Oct. 15, 1973, 48-115630
Int. Cl.[2] B01J *21/06, 23/22*
U.S. Cl. 252—461 3 Claims

1. A catalyst for the selective reduction of nitrogen oxides in exhaust gases in the presence of ammonia, which consists of: vanadium oxide supported on a carrier of the anatase form of titanium oxide.

4,048,113

CATALYTIC COMBUSTION MASS

Roger Paul Pierre Risse, Caluire, France, assignor to Societe Lyonnaise des Applications Catalytiques S.A., Rillieux, La Pape, France

Filed Oct. 21, 1975, Ser. No. 624,469
Claims priority, application France, Oct. 21, 1974, 74.40568
Int. Cl.[2] B01J *21/04, 23/10, 23/26, 23/42*
U.S. Cl. 252—462 6 Claims

1. A contact mass for heterogeneous catalysts which comprises:

a sheet having a thickness of 5 to 20 mm of alumina fibers of a mean diameter of the order of 3 microns with a specific surface area of about 120 to 150 m^2/g and having a decrease in specific surface area of only 11 to 15% upon heating to 700° C
a coating of platinum catalyst on said fibers;
a layer of mineral wool in contact with said sheet and capable of withstanding a surface temperature of at least 500° C.

4,048,114

METHOD OF MAKING COPPER CATALYST ON A SUPPORT

Kenneth Worden Saunders, Owen Sound, Canada, assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 26, 1976, Ser. No. 735,486
Int. Cl.[2] B01J *21/04, 23/72*
U.S. Cl. 252—463 8 Claims

1. In the method of catalyst making which comprises imbibing a catalyst support with aqueous solution of cuprous salt, evaporating the solvent and reducing the residual cuprous salt to elemental copper, the improvement wherein the solvent for the cuprous salt comprises both ammonium carbonate and ammonium hydroxide in combination in aqueous solution and the cuprous salt concentration in the solution is greater than the saturation concentration of the same cuprous salt in water alone or in a solution with either of the ammonium hydroxide or ammonium carbonate cosolvents used alone.

4,048,115

HYDRODESULFURIZATION CATALYST AND METHOD OF PREPARATION

Mark J. O'Hara, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed June 18, 1976, Ser. No. 697,800
Int. Cl.[2] B01J *21/04, 23/64, 23/84*
U.S. Cl. 252—465 2 Claims

1. A method of preparing a catalyst comprising an inorganic oxide carrier material, from about 0.1 to about 20% by weight of a Group VIB metal component and from about 0.1 to about 10% by weight of a Group VIII metal component, calculated as the elemental metals, which method comprises the steps of:
   a. extruding said carrier material in admixture with a salt of a Group VIII metal in an amount sufficient to supply at least 10% but not all of said Group VIII metal component;
   b. drying the resultant extrudate;
   c. calcining said dried extrudate at 700°–1200° F;
   d. impregnating the calcined extrudate with Group VIB and Group VIII metal salts in sufficient amount to supply the remainder of said Group VIII metal component and all of said Group VIB metal component;
   e. drying the thus impregnated extrudate, and
   f. calcining the said impregnated extrudate at 800°–1400° F.

4,048,116

CATALYST FOR THE HYDROGENATION OF ACETYLENE ALCOHOLS

Dieter Voges, Mannheim; Karl Baer, Weinheim; Juergen Boudier, Duerkheim; Siegfried Winderl, Heidelberg-Wieblingen, and Herwig Hoffmann, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 19, 1976, Ser. No. 706,471
Claims priority, application Germany, Aug. 14, 1975, 2536273
Int. Cl.[2] B01J *23/72, 23/84, 23/88*
U.S. Cl. 252—470 4 Claims

1. An essentially unsupported nickel catalyst which comprises nickel as the main ingredient, from about 30 to 40% by weight of copper, based on nickel, and from about 1 to 10% by weight of a mixture of manganese and molybdenum oxides, based on the total weight of the catalyst.

4,048,117

VACUUM SWITCH CONTACT MATERIALS

Werner S. Emmerich, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 29, 1974, Ser. No. 518,908
Int. Cl.[2] H01B *1/02, 1/06*
U.S. Cl. 252—513 8 Claims

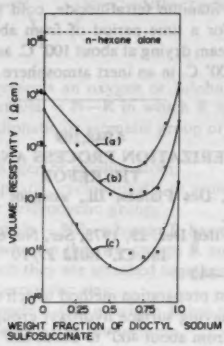
1. A contact material consisting essentially of a refractory material matrix which comprises at least 50% by weight of the contact material, said refractory material matrix having a melting point in excess of 1250° C and a boiling point of less than 3500° C, from about 0.3% to about 2.0% of an element displaying antiwelding characteristics in a vacuum environment and which has a solubility of less than 1.5% at the melting point temperature of the matrix material and the balance essentially being a metal having a high electrical and thermal conductivity.

4,048,118

ANTISTATIC ORGANIC LIQUID COMPOSITION

Yukinori Suzaka, and Shigeru Saeda, both of Oita, Japan, assignors to Showa Denko K.K., Tokyo, Japan

Filed July 18, 1975, Ser. No. 597,162
Claims priority, application Japan, Aug. 27, 1974, 49-97522
Int. Cl.[2] H01B *1/06;* C10L *1/26;* C09K *3/16*
U.S. Cl. 252—518 10 Claims



1. A composition with increased antistatic properties, consisting essentially of
   A. an organic liquid of low conductivity having a volume resistivity greater than 1×10^{10} ohm.cm,
   B. at least one alkali metal salt of an organic acid selected from the group consisting of organic carboxylic acids, organic sulfonic acids, partial alkyl esters or organic polycarboxylic acids and alkyl esters of organic sulfocarboxylic acids, the acids containing 1 to 30 carbon atoms per molecule, and the alkyl group in the alkyl esters having 1 to 22 carbon atoms, and
   C. a polyalkyleneimine salt of phytic acid, the salt being selected from the group consisting of unsubstituted and substituted salts, the substituent being selected from the group consisting of hexyl, octyl, lauryl, stearyl, and oleyl radicals, the total amount of components (B) and (C) being 0.001 to 1000 mg per liter of component (A).

4,048,119

HEATING ELEMENT COMPOSITION AND METHOD FOR PREPARING TUBE FILLINGS OF HIGH ELECTRICAL RESISTANCE FROM FUSED MAGNESIUM OXIDE FOR TUBULAR ELECTRIC HEATING ELEMENTS

Gerd-Edzard Bockstiegel, Troisdorf-Sieglar; Manfred Neidhardt, Siegburg, and Gerhard Rehfeld, Aachen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed June 1, 1976, Ser. No. 691,956
Claims priority, application Germany, June 7, 1975, 2525441
Int. Cl.[2] H01B *1/08*
U.S. Cl. 252—521 16 Claims

1. In an electrical heating element composition comprising crystals of a fused magnesium oxide, the improvement for reducing electrical conductivity of said composition which comprises 0.05 to 5% by weight, based on the amount of said fused magnesium oxide, of a granular magnesium additive composition having a mineralogical composition within the

$MgO—SiO_2—Al_2O_3$ system, said additive composition consisting essentially of amorphous phases and micro- to cryptocrystalline phases, the crystal sizes of the crystalline portions not exceeding 10 microns, said additive having excellent lubricating properties in respect of said magnesium oxide crystals and reacting therewith at 800° to 1050° C with active conductivity centers at the surface of one or more adjacent magnesium oxide crystals.

4,048,120

METHOD OF IMPROVING, ENHANCING OR MODIFYING PERFUME USING CYCLOBUTANE DERIVATIVES

Valentin Rautenstrauch, Grand-Lancy, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Filed May 26, 1976, Ser. No. 690,359

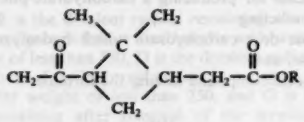
Claims priority, application Switzerland, June 6, 1975, 7355/75

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 **1 Claim**

1. A method for improving, enhancing or modifying the organoleptic properties of perfumes which comprises adding thereto a small but effective amount of at least one compound having the formula

(I)



wherein the symbol R represents a linear or branched alkyl radical containing from 1 to 6 carbon atoms.

4,048,121

LOW TEMPERATURE METAL CLEANING COMPOSITION

Edward H. Chang, Burnsville, Minn., assignor to Fremont Industries, Inc., Shakopee, Minn.

Filed Jan. 24, 1977, Ser. No. 761,582

Int. Cl.² C11D *1/825, 3/43;* C23G *1/14, 5/02*

U.S. Cl. 252—527 **3 Claims**

1. Metal cleaning composition comprising a formulation for preparing aqueous metal cleaning and polishing baths, with the formulation including:

a. an alkaline builder which consists of sodium metasilicate together with an alkaline ingredient selected from the group consisting of sodium hydroxide, sodium carbonate, and mixtures thereof, with said alkaline builder being present in the formulation in an amount equivalent to between about 55 percent and 65 percent by weight of said formulation;

b. sodium gluconate in an amount equivalent to between about 5 percent and 15 percent by weight of said formulation;

c. the tetrasodium salt of ethylenediaminetetraacetic acid (dihydrate) in an amount equivalent to between about 1.5 percent and 5 percent by weight of said formulation;

d. kerosine, a distilled hydrocarbon having a boiling point of between about 150° C. and 300° C. in an amount equivalent to between about 1.5 percent and 3 percent by weight of said formulation; and

e. a biodegradable wetting agent system consisting of a mixture of first and second linear primary alcohol polyethers and a linear alcohol alkoxylate wherein said first linear primary alcohol polyether has a cloud point of about 40° C. said second linear primary alcohol polyether has a cloud point of about 26° C., and said linear alcohol alkoxylate has a cloud point of about 20° C., and wherein the weight ratios of said first linear primary alcohol polyether to said second linear primary alcohol polyether to said linear alcohol alkoxylate ranges from between about 1.5–6.0:1.5–3.5:1.0–2.0.

4,048,122

CLEANING AGENTS FOR CONTACT LENSES

Murray J. Sibley, Berkeley; Gordon H. K. Yung, Sunnyvale, and Petronio D. Urrea, Pleasanton, all of Calif., assignors to Barnes-Hind Pharmaceuticals, Inc., Sunnyvale, Calif.

Filed Jan. 23, 1976, Ser. No. 651,744

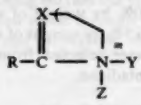
Int. Cl.² C11D *1/38, 3/20, 3/26, 3/37*

U.S. Cl. 252—541 **9 Claims**

1. An aqueous composition for the cleaning of soft and silicone contact lenses which comprises:

a. a water soluble polyalkyleneoxy modified dimethysilicone resin in an amount of about 0.5 to 2 weight percent

b. at least one fatty acid amide or nitrogen analog thereof of the formula



wherein:

R is an aliphatic group of from 9 to 13 carbon atoms having a total unsaturation of from 0 to 1 site of olefinic unsaturation;

X is oxygen or nitrogen;

m is 0 when X is oxygen and 1 when X is nitrogen, wherein the nitrogen to which Y and Z are bonded is positive;

when *m* is O, Y and Z are hydroxyethyl; and

when *m* is 1, Y is carboxymethyl and Z is 2'-(carboxymethoxy) ethyl-1;

with the proviso that the carboxy group may be present as the acid or its physiologically acceptable salt;

and wherein the total amount of fatty acid amide and nitrogen analog thereof present is in the range of about 0.25 to 2.5 weight percent, and wherein the remainder of the composition is water.

4,048,123

ABRADANT SKIN CLEANSER

Jack Hramchenko, Menlo Park, and Murray J. Sibley, Berkeley, both of Calif., assignors to Barnes-Hind Pharmaceuticals, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 389,297, Aug. 17, 1973, Pat. No. 3,944,506. This application July 3, 1974, Ser. No. 485,397

Int. Cl.² A61K *7/50;* C11D *3/12, 3/22, 17/08*

U.S. Cl. 252—545 **2 Claims**

1. An abradant skin cleansing cream composition having from 35 to 60 weight percent of sodium citrate particles of an average particle size in the range of about 125 to 750μ and from 40 to 65 weight percent of a cream base composition comprising from about 10 to 50 weight percent of a sodium taurate anionic foaming agent; from about 3 to 12 weight percent of a polyol fatty acid ester nonionic surfactant; from about 40 to 60 weight percent water; and from about 0.05 to 8 weight percent of the sodium salt of laurylsulfoacetate.

2. An abradant skin cleansing cream composition having from 35 to 60 weight percent of sucrose particles of an average particle size in the range of about 125 to 750μ from 40 to 65 weight percent of a cream base composition comprising from about 10 to 50 weight percent of a sodium taurate anionic foaming agent; from about 3 to 12 weight percent of a polyol fatty acid ester nonionic surfactant; from about 40 to 60 weight percent water; and from about 0.05 to 8 weight percent of the sodium salt of laurylsulfoacetate.

4,048,124

PRESSURE SENSITIVE ADHESIVE

Atsuo Ishikawa, Kamakura; Hidemi Tsubaki, Kawasaki; Hitoshi Takahata; Riso Iwata, both of Kamakura, and Yonesaku Shinohara, Toyama, all of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan

Filed Feb. 10, 1976, Ser. No. 656,978

Claims priority, application Japan, Feb. 13, 1975, 50-18341

Int. Cl.[2] C08L *7/00, 9/00, 9/06*

U.S. Cl. 260—5 **10 Claims**

1. A pressure sensitive adhesive composition comprising (A) 100 parts by weight of a conjugated diene rubber selected from the group consisting of natural rubber and synthetic rubber having a Mooney viscosity (ML_{1+4}/100° C) of at least 30 and containing at least 50% by weight of a conjugated diolefin unit in the polymer chain, and (B) 30 to 250 parts by weight of a hydrocarbon resin having a softening point of 60° C to 140° C and consisting essentially of (a) 45 to 85% by weight of a unit derived from 1,3-pentadiene, (b) 10 to 45% by weight of a unit derived from α-methylstyrene, (c) 3 to 20% by weight of a unit derived from cyclopentene, (d) 0 to 20% by weight of a unit derived from 1,3-butadiene, and (e) 0 to 5% by weight of a unit derived from copolymerizable monomer selected from isoprene, cyclopentadiene and dicyclopentadiene.

4,048,125

ANTI-MIGRATORY ADDITIVE FOR EMULSIFIED PHENOLIC RESIN SYSTEMS CONTAINING A PROTEINACEOUS COLLOID

Woodrow Hayes Ingram, II, Hampden, Mass., assignor to Monsanto Company, St. Louis, Mich.

Division of Ser. No. 323,680, Jan. 15, 1973, Pat. No. 3,932,333, which is a continuation-in-part of Ser. No. 142,905, May 13, 1971, Pat. No. 3,719,616, which is a continuation-in-part of Ser. No. 8,679, Feb. 4, 1970, abandoned. This application Dec. 1, 1975, Ser. No. 636,476

The portion of the term of this patent subsequent to May 30, 1989, has been disclaimed.

Int. Cl.[2] C08L *89/00, 89/02*

U.S. Cl. 260—7 **8 Claims**

1. An emulsified liquid phenolic resin system containing spherules of phenolic resin dispersed in aqueous medium, at least about 80 percent of the spherules ranging in size from about 0.01 to 0.8 microns, and comprising:

A. a quantity of solids ranging from about 5 to 45 parts by weight, comprising the phenolic resin, a water soluble dissolved proteinaceous protective colloid in basic form, and a water soluble dissolved polyacrylate salt,

B. a quantity of organic liquid ranging from about 0 to 20 parts by weight, and

C. a quantity of water ranging from 35 to 95 parts by weight; wherein:

a. the phenolic resin is characterized by:

1. having a water dilutability of from 15 percent to 2000 percent based on the resin solids,

2. having a formaldehyde to phenol combined mole ratio of from about 0.85 to 3.0, and

3. having a viscosity in methanol solution at 60 weight percent solids concentration of not greater than about 10,000 centipoises;

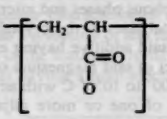
b. the polyacrylate salt is characterized by:

1. having its cations selected from the group consisting of alkali metals and ammonium,

2. having a molecular weight of from about 100,000 to 700,000,

3. having a pH of from about 8 to 10 when in a 13 weight percent aqueous solution, and

4. containing at least about 100 units per molecule of the structure:



; and

c. the ratio of phenolic resin to proteinaceous colloid is in the range of 99:1 and 88:12, the ratio of phenolic resin to polyacrylate salt is in the range of 98.6:0.4 and 70.4:20, and the solids comprise between 0.04 and 20 parts by weight of polyacrylate salt per 100 parts of solids.

4,048,126

PROCESS FOR PRODUCING CARBOHYDRATE-PHENOL CONDENSATION RESINS

John P. Gibbons, Western Springs, and Lawrence Wondolowski, Downers Grove, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed July 22, 1976, Ser. No. 707,598

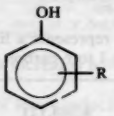
Int. Cl.[2] C08L *3/02*

U.S. Cl. 260—17.2 **13 Claims**

1. A process for producing a carbohydrate-phenolic resin comprising reacting

1. dextrose or a carbohydrate which hydrolyzes to form dextrose, and

2. a phenolic compound having the formula



wherein R is selected from the group consisting of C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halogen, hydroxy and hydrogen, in the presence of a metal salt Lewis acid catalyst to form a solid, fusible resin, and separating the resin from the reaction mixture.

4,048,127

CARBOHYDRATE-BASED CONDENSATION RESIN

John P. Gibbons, Western Springs, and Lawrence Wondolowski, Downers Grove, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed July 22, 1976, Ser. No. 707,600

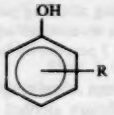
Int. Cl.[2] C08L *3/02*

U.S. Cl. 260—17.2 **23 Claims**

1. A process for producing a carbohydrate-phenolic resin comprising reacting in the presence of an acid catalyst

1. an aldose saccharide;

2. a phenolic compound having the formula



wherein R is selected from the group consisting of C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halogen, hydroxy and hydrogen; and

3. urea;

to form a solid, fusible resin, and separating the resin from the reaction mixture.

4,048,128
THERMALLY STABILIZED SEGMENTED COPOLYESTER ADHESIVE

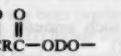
Ernest Francis Eastman, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 443,984, Feb. 20, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,064

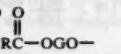
Int. Cl.[2] C08K *3/22;* **C08L** *67/00, 91/00*

U.S. Cl. 260—22 R **66 Claims**

1. A thermally stabilized thermoplastic segmented copolyester consisting essentially of a multiplicity of recurring short chain ester units and long chain ester units joined through ester linkages, said short chain ester units amounting to 15 to 75 percent by weight of said copolyester and being of the formula

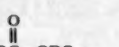


and said long chain ester units amounting to 25 to 85 percent by weight of said copolyester and being of the formula



wherein R is the divalent radical remaining after removal of the carboxyl groups from a dicarboxylic acid having a molecular weight of less than 350, D is the divalent radical remaining after removal of the hydroxyl groups from organic diol having a molecular weight of less than 250, and G is the divalent radical remaining after removal of the terminal hydroxyl groups from long chain glycol having an average molecular weight of 350 to 6000, said copolyester having a melt index of less than 150, a melting point of at least 90° C., an inherent viscosity in the range of 1.0 to 1.7 and an acid number not greater than 3, stabilized with 0.05 to 3.0 percent by weight, based on the weight of copolyester, of an alkaline earth oxide stabilizer.

22. A thermally stabilized thermoplastic hot melt adhesive composition in the molten state which comprises, based on the total thermoplastic components, (A) 1 to 99 percent by weight of thermoplastic segmented copolyester consisting essentially of a multiplicity of recurring short chain ester units and long chain ester units joined through ester linkages, said short chain ester units amounting to 15 to 75 percent by weight of said copolyester and being of the formula



and said long chain ester units amounting to 25 to 85 percent by weight of said copolyester and being of the formula

wherein R is the divalent radical remaining after removal of the carboxyl groups from a dicarboxylic acid having a molecular weight of less than 350, D is the divalent radical remaining after removal of the hydroxyl groups from organic diol having a molecular weight of less than 250, and G is the divalent radical remaining after removal of the terminal hydroxyl groups from long chain glycol having an average molecular weight of 350 to 6000, said copolyester having a melt index of less than 150, a melting point of at least 90° C., an inherent viscosity in the range of 1.0 to 1.7, and an acid number of less than 3; (B) 1 to 99 percent by weight of low molecular weight thermoplastic resin which forms compatible mixtures with the segmented copolyester, is thermally stable at 150° C., and has a melt viscosity of less than 10,000 centipoises at 200° C.; stabilized against substantial loss in viscosity in said molten state with (C) 0.1 to 4.0 percent by weight, based on the weight of copolyester and resin, of an alkaline earth oxide.

4,048,129
PREPARING THERMO-PLASTIC OR ELASTOMERIC MATERIALS FOR CROSS-LINKING OF GRAFTED SILANE

Hermann Uwe Voigt, Langenhagen, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Sept. 8, 1975, Ser. No. 611,519

Claims priority, application Germany, Sept. 19, 1974, 2444829

Int. Cl.[2] C08F *8/12, 8/42, 8/00, 8/06*

U.S. Cl. 260—23 H **17 Claims**

1. In a method cross-linking thermo-plastic or elastomeric material in the presence of moisture, the material being prepared by grafting a silane compound, the improvement comprising the step of adding to and mixing with the material, compounds which form water by chemical reaction, the adding being carried out prior to grafting to obtain cross-linking of grafted silane through the water as formed in situ by the reaction and throughout the material.

4,048,130
PROCESS FOR THE PRODUCTION OF SELF-CROSS-LINKING LACQUERS

Marcel Brunold; Klaus Hering; Paul Wicht; Christian Vonlanthen, all of Fribourg; Jurg Kislig, Ostermundigen, and Theodor Volker, Fribourg, all of Switzerland, assignors to Lonza Ltd., Gampel, Valais, Switzerland

Filed Mar. 10, 1975, Ser. No. 557,061

Claims priority, application Switzerland, Mar. 8, 1975, 3265/75

Int. Cl.[2] C08L *35/02*

U.S. Cl. 260—29.6 NR **34 Claims**

1. The process for preparing a lacquer utilizing an aqueous dispersion, the lacquer being pigmented or non-pigmented, being self-cross linking upon heat treatment and containing a binder consisting essentially of the copolymer obtained from the copolymerization of the following monomers:

a. 30 to 70 parts by weight, based on the total weight of the binder, of at least one monomer whose homopolymer has a theoretical glass temperature of less than 10° C.,

b. 30 to 70 parts by weight, based on the total weight of the binder, of at least one monomer whose homopolymer has a theoretical glass temperature of more than 30° C.,

c. 0.5 to 5 parts by weight, based on the total weight of the binder, of at least one polymerizable acid or anhydride thereof or a compound thereof which is an amide, halide, nitrile or semiester thereof, said polymerizable acid being an olefinic acid having 3 to 7 or more carbon atoms, an unsaturated dibasic acid having 4 to 8 or more carbon atoms,

d. 2 to 35 parts by weight, based on the total weight of the binder, of at least one reactive monomer, said reactive monomer being a monomer having at least one hydroxyl group and which is the reaction product of a dihydric alcohol having 1 to 8 **carbon atoms or of a trihydric alcohol having** 1 to 8 carbon atoms and an olefinic acid having 3 to 8 carbon atoms, a monomer having at least one hydroxyl group and which is the ester of an unsaturated dibasic acid having 4 to 8 carbon atoms in the acid group, a chlorohydroxy ester of an unsaturated acid, a monomer having a functional amide group or groups, a monomer having a methylolized amide group, n-butoxymethyleneacrylic amide, a monomer with a functional allyl grouping or groups or a monomer having a functional aziridinyl grouping or groups,

e. 0.5 to 35 parts by weight, based on the total weight of the binder, of at least one alkali metal or ammonium salt of a polymerizable sulfonic acid compound, which comprises conducting the polymerization in an aqueous dispersion in

a reaction vessel at a preselected temperature between 15° and 30° C. and at a starting pH of 3 to 4 in the presence of a redox system consisting of 0.005 to 0.5 percent by weight, based on the total weight of the monomers, of at least one alkali metal and/or ammonium persulfate, 0.001 to 0.5 percent by weight ascorbic acid, based upon the total weight of the monomers, and 10 to 30 p.p.m., of at least one iron (II)-salt, no more than 30 percent of the monomers and the majority of the persulfate being inserted into the reaction vessel before the polymerization step itself starts, after the polymerization step itself starts, dosing in the remaining amount of monomers concurrently and parallel with the iron (II)-salt and the ascorbic acid in such a manner that the preselected polymerization temperature remains almost constant.

4,048,131

POLYOXYETHYLENE ALKYL ETHER ADDITIVES IN IMPACT RESISTANT COMPOSITIONS OF POLYPROPYLENE

Robert G. Keske, Naperville; Wassily W. Poppe, Lombard, and Ivor R. Fielding, Naperville, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 25, 1975, Ser. No. 599,086

Int. Cl.² C08K *5/06*

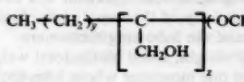
U.S. Cl. 260—33.2 R **9 Claims**

1. An impact and flow modified polypropylene composition comprising:

a. a polypropylene having a flow rate, determined according to ASTM D1238 Condition L, in the range of 0.2 to 25 grams/10 minutes; and

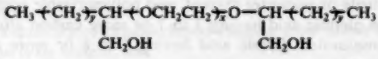
b. a polyoxyethylene alkyl ether derivative, in an amount effective to increase both impact resistance at room temperature and flow rate of said composition, selected from the group consisting of:

i. a compound defined by a first formula:



where in said first formula *x*, *y*, and *z* are selected from the group consisting of: (1) *x* which is in the range 3–10, *y* which is in the range 12–15, and *z* which is 1; and (2) *x* which is in the range 5–12, *y* which is in the range 11–13, and *z* which is 0; and

ii. a compound defined by a second formula:



where in said second formula the *x* and each *y* are individually selected from the group consisting of:

1. *x* is in the range 7–11, and *y* which is in the range 12–15; and

2. *x* which is in the range 12–14, and *y* which is in the range 8–11.

4,048,132

PRINTING INK COMPOSITION

Shozo Tsuchiya, Kawasaki; Hideo Hayashi, and Akio Oshima, both of Yokohama, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Filed Aug. 2, 1976, Ser. No. 710,659

Claims priority, application Japan, Aug. 5, 1975, 50-94694

Int. Cl.² C08F *232/06, 232/08;* C08K *5/01*

U.S. Cl. 260—33.6 UA **12 Claims**

1. Printing ink composition characterized by containing as a vehicle a resin having a softening point of 100° C. or more and an acid value of 5 to 50, said resin being obtained by reacting the following three components A, B and C, i.e.,

A Component:

at least one compound selected from the group consisting of cyclopentadiene, dicyclopentadiene and their C_1–C_6 alkyl-substituted derivatives;

B Component:

at least one α,β-unsaturated monocarboxylic acid selected from the group consisting of acrylic acid and methacrylic acid;

C Component:

at least one alkyl ester of said α,β-unsaturated monocarboxylic acid as the B component with the proviso that the number of carbon atoms of said alkyl group is from 1 to 22;

in proportions of such amounts as to satisfy the following formulae (1) and (2),

$$0.05 \leqq \frac{[B]+[C]}{[A]} \leqq 1.0 \quad (1)$$

$$1/5 \leqq \frac{[C]}{[B]} \leqq 5 \quad (2)$$

at a temperature in the range of 150°–350° C. in the absence of a catalyst.

4,048,133

GLASS FIBER-REINFORCED THERMOPLASTIC POLYCARBONATE MOLDING COMPOSITIONS WITH IMPROVED TOUGH-ELASTIC PROPERTIES

Siegfried Adelmann; Dieter Margotte, both of Krefeld, and Josef Merten, Korschenbroich, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 584,553, June 6, 1975, abandoned. This application July 6, 1976, Ser. No. 702,549

Claims priority, application Germany, June 21, 1974, 2429816

Int. Cl.² C08E *63/62;* C08G *65/00;* C08L *69/00*

U.S. Cl. 260—37 PC **5 Claims**

1. Polycarbonate molding compositions based on high molecular thermoplastic aromatic polycarbonates containing 10–30% by weight of glass fibers (relative to the total weight of polycarbonate + glass fibers) and containing 1–5% by weight of poly-(256-dialkyl-1,4-phenylene oxide) (relative to the weight of glass fibers).

4,048,134

REFRACTORY HEAT-INSULATING MATERIALS

John Henry Courtenay, and Martin Bernard Peter Wardell, both of Birmingham, England, assignors to Foseco Trading A.G., Chur, Switzerland

Filed Feb. 5, 1976, Ser. No. 655,372

Claims priority, application United Kingdom, Feb. 10, 1975, 5636/75

Int. Cl.² C08K *3/22*

U.S. Cl. 260—38 **9 Claims**

1. A refractory heat-insulating composition consisting essentially of, by weight:

1 to 11% fibrous material 4 to 8% synthetic resin binder and 80 to 95% a mixture of particulate magnesia and particulate olivine,

the weight ratio of magnesia: olivine being from 1:10 to 4:1 and the composition containing not more than 4% by weight of cellulosic fibrous material and not more than 7% by weight refractory fibrous material.

4,048,135

POLYESTER MOLDING COMPOSITIONS OF REDUCED FLAMMABILITY

Rolf Wurmb, Heidelberg; Bernd Leutner; Wolfgang Seydl, both of Frankenthal; Hans-Ulrich Schlimper, Speyer, and Hans-Josef Sterzel, Dannstadt-Schauernheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Mar. 8, 1976, Ser. No. 665,062

Claims priority, application Germany, Mar. 21, 1975, 2512504

Int. Cl.² C08K *3/40, 3/34, 5/03*

U.S. Cl. 260—40 R 6 Claims

1. Thermoplastic molding composition composed of

A. a linear saturated polyester, and

B. from 6 to 30% by weight, based on the total weight of the molding composition, of a flameproofing additive of an organic halogen compound and antimony trioxide,

said antimony trioxide having been precipitated onto a support from an aqueous antimony (III) halide solution by the addition of an aqueous solution of a base to increase the pH to from 6 to 8, followed by isolation of the solids from the aqueous phase, said support

3. A molding composition as set forth in claim 1 wherein said composition further contains from 10 to 60% by weight, based on the total weight of the molding composition, of reinforcing fillers.

4,048,136

METALLIC TONE POWDER COATING COMPOSITION

Sadao Kobayashi; Hiroshi Ozawa, and Nobuki Kobayashi, all of Yokohama, Japan, assignors to Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chem., Inc.), Tokyo, Japan

Continuation of Ser. No. 485,637, July 3, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,518

Claims priority, application Japan, July 7, 1973, 48-76784

Int. Cl.² C08K *9/04, 9/10*

U.S. Cl. 260—42.14 8 Claims

1. A powdery metallic powder-acrylic resin coating composition comprising a mixture of (a) solid powder particles of vinyl copolymer having a glass transition point of at least 20° C and wherein an acrylic ester and a methacrylic ester monomer together constituting at least 30% by weight of the total monomers of said copolymer, and (b) for each about 100 parts by weight of said copolymer particles about 0.1–50 parts by weight of solid particles of a polymer-encapsulated metal powder obtained by activating a metallic powder by treatment with (1) an organic or mineral acid followed by neutralization of the thus-treated powder with an alkali, or (2) an aqueous solution of phosphoric acid; and subjecting the activated metallic powder to an in situ polymerization in an aqueous medium of at least one vinyl monomer in the presence of a radical polymerization initiator, the amount of such vinyl monomer being such as to form about 0.2 – 20 parts by weight of said encapsulating polymer per 100 parts of said metallic powder.

4,048,137

ELASTOMERIC MATERIALS REINFORCED WITH SMALL DIAMETER GLASS FIBERS

Glenn Alvin Heitmann, Morrison, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 629,200, Nov. 5, 1975, abandoned. This application Aug. 9, 1976, Ser. No. 712,616

Int. Cl.² C08K *7/14*

U.S. Cl. 260—42.15 13 Claims

1. A composition of matter comprising an elastomeric matrix of natural or synthetic rubber reinforced with 5 to 150 phr of glass fibers having diameters in the range of 0.5 to 3.8 microns and lengths in the range of 3 to 50 mm.

4,048,138

STABILIZATION OF TALC-FILLED POLYSTYRENE

Christian John Miga, Littleton, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Filed July 19, 1976, Ser. No. 706,878

Int. Cl.² C08K *3/34*

U.S. Cl. 260—42.37 12 Claims

1. A polystyrene composition filled with at least 20% by weight of talc and stabilized against short-term color degradation, which comprises, in parts by weight:

polystyrene	25 to 80 parts
talc	20 to 75 parts

and 0.5 to 5 parts of a mixture of polyester forming reactants comprising a polybasic organic acid or anhydride and a polyhydric alcohol, each having a melting point in the range of 250° to 550° F, said organic acid or anhydride and said alcohol each being present in said mixture in an amount of from 1 to 2 parts by weight per 3 parts by weight of said mixture.

4,048,139

RENDERING POLYBENZIMIDAZOLE SOLID MATERIALS MORE RESISTANT TO DARKENING UPON EXPOSURE TO LIGHT

Gordon W. Calundann, North Plainfield, and Edward J. Powers, Gillette, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 11, 1975, Ser. No. 549,040

Int. Cl.² C08K *3/22, 3/30, 5/34, 5/36*

U.S. Cl. 260—45.8 N 32 Claims

1. An improved process for the formation of a polybenzimidazole solid material having an enhanced resistance to undergo the usual color darkening upon exposure to light comprising:

a. forming a solution of polybenzimidazole in a solvent selected from the group consisting essentially of N,N-dimethyacetamide, N,N-dimethylformamide, dimethylsulfoxide, and N-methyl-2-pyrrolidone, with said solution having dispersed therein a minor concentration of finely divided pigment selected from the group consisting essentially of arsenic thioarsenate, copper phthalocyanine, anatase titanium dioxide, and mixtures of the foregoing, and

b. substantially removing said solvent from said polybenzimidazole to form a polybenzimidazole solid material wherein said finely divided pigment is substantially uniformly dispersed therein in a concentration of about 0.1 to 8 percent by weight based upon the weight of the polybenzimidazole.

4,048,140

LIGHT RESISTANT POLYOLEFIN COMPOSITIONS

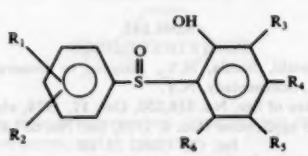
Dwight William Chasar, Northfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 2, 1976, Ser. No. 738,267

Int. Cl.² C08K *5/41*

U.S. Cl. 260—45.95 C 9 Claims

1. A polyolefin containing a stabilizing amount of a 2-hydroxydiphenyl sulfoxide of the general formula



wherein R_1 is hydrogen, R_2 is a lower alkyl or halogen, R_3 is

hydrogen or a lower alkyl, R_4 is hydrogen or lower alkyl, R_5 is hydrogen or a lower alkyl and R_6 is hydrogen or lower alkyl.

4,048,141

LATENT CATALYSTS FOR PROMOTING REACTION OF EPOXIDES WITH PHENOLS AND/OR CARBOXYLIC ACIDS

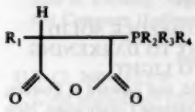
George A. Doorakian, Bedford, Mass.; Dennis L. Schmidt, Houston, Tex., and Martin C. Cornell, III, Sao Paulo, Brazil, assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 629,345, Nov. 6, 1975, abandoned, which is a continuation of Ser. No. 417,844, Nov. 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 290,891, Sept. 21, 1972, abandoned. This application Jan. 19, 1976, Ser. No. 650,212

Int. Cl.[2] C08G *30/04*

U.S. Cl. 260—47 EC 20 Claims

6. A composition comprising (a) an epoxide bearing at least one vicinal epoxy group per molecule; (b) a phenol and (c) a small but catalytic amount of a phosphorus-containing catalyst corresponding to the formula



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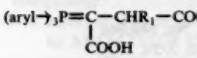

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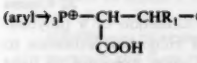

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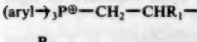

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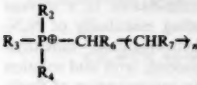

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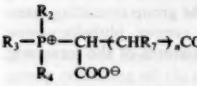
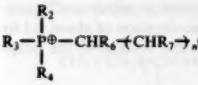


VI,

or



VII,

or a mixture thereof, wherein:

R_1 is hydrogen or hydrocarbyl,

R_2–R_4 are hydrocarbyl groups, with the proviso that R_2–R_4 are not each aryl in formula VII,

R_5 is hydrogen or alkyl,

R_6 is hydrogen, alkyl, carboxy, or alkoxy carbonyl,

R_7 is hydrogen or hydrocarbyl,

n is from 0 to about 20, and

A^- is a compatible anion.

4,048,142

POLYETHERIMIDES

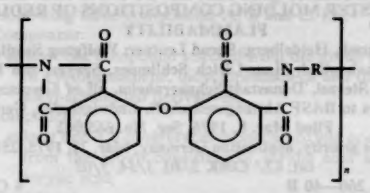
Tohru Takeoshi, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 514,030, Oct. 11, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,698

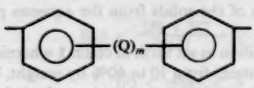
Int. Cl.[2] C08G *73/10*

U.S. Cl. 260—47 CP 5 Claims

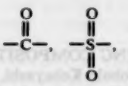
1. Polyetherimides having the formula



where R is a divalent organo radical selected from the class consisting of (a) aromatic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane cycloalkylene radicals having from 2-20 carbon atoms, and (c) divalent radicals included by the formula,



where Q is a member selected from the class consisting of —O—,



—S—, $-C_xH_{2x}-$ and x is a whole number from 1 to 5 inclusive, m is 0 or 1 and n is an integer equal to from 2 to 2500 inclusive.

4,048,143

PROCESS FOR CAPPING POLYPHENYLENE OXIDE

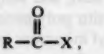
Allan S. Hay, and Dwain M. White, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 441,294, Feb. 11, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,072

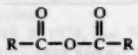
Int. Cl.[2] C08G *65/44, 65/48*

U.S. Cl. 260—47 ET 8 Claims

1. A process comprising contacting a polyphenylene oxide with a capping agent selected from the class consisting of monoacyl halides of the formula



hydrocarbon monosulfonyl halides of the formula $R—SO_2—X$, anhydrides of monocarboxylic acids of the formula



alkyl halides of the formula R-X, dialkyl sulfates of the formula $R—O—SO_2—O—R$, wherein R is alkyl, cycloalkyl, or mixtures thereof, X is chlorine, bromine, fluorine or iodine, wherein the mole ratio of capping agent to hydroxyl group per polymer unit is within the range of from about 0.5:1 to about 10:1 and wherein said contacting is carried out at a temperature within the range of from about 0° to about 100° C. in the presence of (1) a water soluble base selected from the class consisting of alkali metal and alkaline earth metal hydroxide or carbonate bases, (2) a catalytic phase transfer agent, and optionally, (3) an effective organic phase reducing agent.

4,048,144

PREPARATION OF SOLID POLYMERS FROM AROMATIC PRIMARY DIAMINE AND ACYL HALIDE OF TRIMELLITIC ANHYDRIDE

James R. Stephens, Gary, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 596,765, Nov. 25, 1966, Pat. No. 3,920,612, which is a continuation-in-part of Ser. No. 252,557, Jan. 21, 1963, abandoned, Ser. No. 336,857, Jan. 10, 1964, abandoned, and Ser. No. 535,367, March 18, 1966, abandoned. This application Aug. 4, 1975, Ser. No. 601,798

The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.

Int. Cl.[2] C08G *73/14*

U.S. Cl. 260—47 CP **7 Claims**

1. A process for preparing high molecular weight solid polymers having film-forming properties and being soluble in an organic solvent, which process comprises (a) reacting essentially equimolar amounts of a carbocyclic aromatic primary diamine and an acyl halide derivative of trimellitic anhydride which contains at least one acyl halide group and that in the 4-ring position, in said organic solvent, under substantially anhydrous conditions, and for a period of time and at a temperature, below 150° C., controlled to produce a polymer with free carboxyl groups and amide groups available for further reaction, said polymer being soluble in said organic solvent and wherein the reaction produces hydrogen halide, and (b) washing with water said polymer.

4,048,145

PHENOLIC POLYMER PREPARED FROM O-CRESOL

Ernest K. Moss, St. Petersburg, Fla., assignor to The Celotex Corporation, Tampa, Fla.

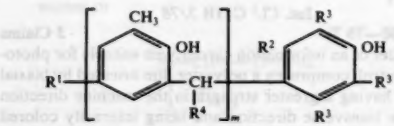
Division of Ser. No. 509,565, Sept. 27, 1974, Pat. No. 3,953,645, which is a division of Ser. No. 354,636, April 26, 1973, Pat. No. 3,876,620. This application Sept. 17, 1975, Ser. No. 614,086

Int. Cl.[2] C08G *5/08*

U.S. Cl. 260—57 R **7 Claims**

1. An alkylol group containing phenolic polymer of Formula I:

(I)

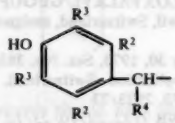


wherein:

a. R^1 is

hydrogen or a radical of Formula II:

(II)



b. the R^2's are independently selected from the group consisting of lower alkyl, phenyl, benzyl, halo, nitro and hydrogen,

c. The R^3's are independently selected from the group consisting of

hydrogen or a radical of Formula II, wherein at least one of the R^3's is alkylol,

d. the R^4's are independently selected from the group consisting of lower alkyl, hydrogen, phenyl, benzyl, or furyl,

e. *m* is an integer from 2 to 10 inclusive,

f. the phenolic polymer has a molecular weight between 200 and 2000.

4,048,146

RADIATION SENSITIVE POLYMERS OF OXYGEN-SUBSTITUTED MALEIMIDES AND ELEMENTS CONTAINING SAME

John Charles Wilson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

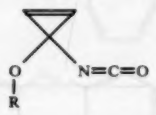
Division of Ser. No. 621,728, Oct. 14, 1975. This application Dec. 20, 1976, Ser. No. 752,229

Int. Cl.[2] C08F *26/06*

U.S. Cl. 260—63 UY **30 Claims**

1. A crosslinkable polymer comprising:

A. from about 1 to 100 mole percent of a polymerized monomer having the formula

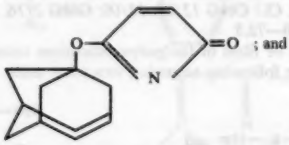


wherein R is a hydrocarbon group having from 2 to 20 carbon atoms; and

B. from 0 to about 99 mole percent of at least one additional polymerized ethylenically unsaturated monomer.

7. A radiation sensitive polymer comprising

A. from about 1 to 100 mole percent of a polymerized monomer having the formula



; and

B. from 0 to about 99 mole percent of at least one additional polymerized ethylenically unsaturated monomer.

9. A radiation sensitive element comprising a support having coated thereon at least one radiation sensitive layer comprising a radiation sensitive polymer comprising

A. from about 1 to 100 mole percent of a polymerized monomer having the formula

wherein R is a hydrocarbon group having from 2 to 20 carbon atoms; and

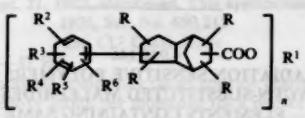
B. from 0 to about 99 mole percent of at least one additional polymerized ethylenically unsaturated monomer.

4,048,147
CARBOXYLIC ACID OF CYCLOPENTADIENE DERIVATIVE, SALT THEREOF, OR ESTER THEREOF AND PROCESS FOR PRODUCING THESE COMPOSITIONS

Masatoshi Arakawa; Ryotaro Ohno; Katuhiro Ishikawa; Noboru Yamahara, and Hisashi Matsui, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,630
Claims priority, application Japan, Nov. 30, 1974, 49-136642
Int. Cl.[2] C08G *2/00, 2/18, 10/00*
U.S. Cl. 260—67 UA 34 Claims

1. A composition represented by the formula,



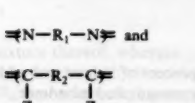
wherein R is hydrogen or an alkyl group having 1 to 3 carbon atoms, said four R groups being the same or different; R^1 is hydrogen, a mono- to tetra-hydric aliphatic alcohol moiety having 1 to 12 carbon atoms, an alkali or alkaline earth metal, an ammonium group, or an organic amine residue; n is an integer of 1 to 4; and R^2, R^3, R^4, R^5 and R^6, which may be the same or different, are independently hydrogen or alkyl groups having 1 to 6 carbon atoms, or R^2 and R^3 may form a ring when taken together.

4,048,148
POLYAZOMETHINE FIBERS AND FILMS

Paul Winthrop Morgan, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 576,236, May 9, 1975, abandoned. This application Mar. 19, 1976, Ser. No. 667,431
Int. Cl.[2] C08G *12/08, 12/00;* G08G *2/16, 2/14*
U.S. Cl. 260—72.5 20 Claims

1. Fibers or films of (co)polyazomethines consisting essentially of the following recurring structural units



(I)

(II)

wherein units I and II are present in substantially equimolar amounts; Z_1 and Z_2, which may be the same or different, are selected from the group of a hydrogen atom or a methyl or ethyl radical; and R_1 and R_2, are radicals selected from the group of (1) single and fused 6-membered carbocyclic ring systems in which one of the ring carbons of an aromatic ring, if present, may be replaced by nitrogen and wherein the chain extending bonds of the ring system, if attached to a single ring, are positioned 1,4- to each other, and if attached to different rings, are in positions parallel and oppositely directed, and (2) multiple ring systems in which the individual rings are joined by a chemical bond or a bridging unit not exceeding fourteen atoms in length and in which the chain extending bonds of each ring are in the 1,4-positions and R_1 may be a chemical bond.

4,048,149
WATER-SOLUBLE SULFONATED POLYESTERS

Jacques Fritz, Champagne au Mont d'Or; Paul Roux, Fontaine sur Saone, and Jean Néel, Lyon, all of France, assignors to Rhone-Poulenc Industries, Decines, France

Continuation-in-part of Ser. No. 371,534, June 19, 1973, abandoned. This application June 10, 1975, Ser. No. 585,679
Claims priority, application France, Jan. 10, 1973, 73.01358
Int. Cl.[2] C08G *63/68, 63/76;* C07C *69/80, 69/82*
U.S. Cl. 260—75 S 2 Claims

1. A water-soluble, sulfonated polyester, comprising the polycondensation product of a mixture of dicarboxylic compounds consisting essentially of:
   a. an aromatic diacid or one of its diesters selected from the group consisting of isophthalic and terephtalic acids and the methyl, ethyl, propyl and butyl diesters thereof, and
   b. an unsaturated aliphatic diacid or anhydride or diester thereof selected from the group consisting of maleic, fumaric, and itaconic acids, the anhydrides thereof, and the methyl, ethyl, propyl and butyl diesters thereof
   the molar ratio of said aliphatic unsaturated diacid to said mixture of dicarboxylic compounds being comprised between 0.1 and 0.5; with
   c. a saturated glycol selected from the group consisting of ethyleneglycol and di-, tri-, tetra-, and penta ethyleneglycol, propyleneglycol and butyleneglycol
   said condensation product being sulfonated by the quantitative addition of sodium bisulfite or metabisulfite onto the unsaturated aliphatic chains thereof.

4,048,150
LEADER OF A CARRIER OF INFORMATION IN THE FORM OF A WEB

Rolf Bergmann, Wiesbaden-Schierstein; Klaus Hoheisel, Wiesbaden-Biebrich; Helmut Schafer, Russelsheim, and Manfred Unger, Schlangenbad, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 15, 1975, Ser. No. 640,774
Claims priority, application Germany, Dec. 16, 1974, 7441800[U]
Int. Cl.[2] G11B *5/78*
U.S. Cl. 260—75 T 3 Claims

1. A leader of an information carrier web suitable for photoelectric control, comprising a polyester film oriented by biaxial stretching having a greater strength in the machine direction than in the transverse direction and being internally colored with an organic dye which is sufficiently heat-resistant and which has a sufficiently low light absorption said leader having one layer and a transparency of at least 60 percent when exposed to light of a wavelength of 750 nm.

4,048,151
CATIONIC DYES CONTAINING AN OPTIONALLY SUBSTITUTED BICYCLIC OR POLYCYCLIC ARYLOXYALKYL GROUP

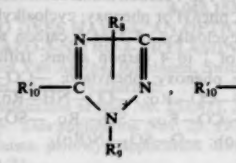
Beat Henzi, Neuallschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

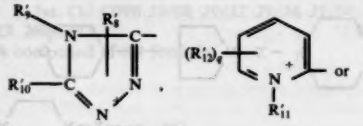
Filed July 30, 1973, Ser. No. 383,781
Claims priority, application Switzerland, July 31, 1972, 11354/72; Feb. 21, 1973, 2523/73
Int. Cl.[2] C09B *1/32, 23/10, 23/12, 29/08*
U.S. Cl. 260—156 23 Claims

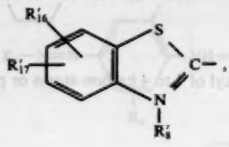
1. A dye of the formula

$$P—N=N—K' \; A^-,$$

wherein
P is

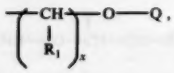




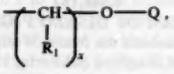


wherein

R'_8 is alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; alkenyl of 2 to 4 carbon atoms; alkenyl of 2 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; cyclohexyl; cyclohexyl substituted by alkyl of 1 to 4 carbon atoms; or

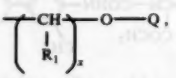


R'_9 is alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; cyclohexyl; cyclohexyl substituted by alkyl of 1 to 4 carbon atoms; phenyl; phenyl substituted by halo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms; or



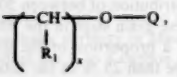
R'_{10} is hydrogen or R'_9,

R'_{11} is alkoxy of 1 to 4 carbon atoms; alkoxy of 1 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; alkenyl of 2 to 4 carbon atoms; alkenyl of 2 to 4 carbon atoms substituted by hydroxy, halo, cyano, phenyl or carbamoyl; or



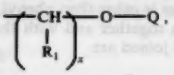
each

R'_{12} is independently phenyl, halo, nitro, cyano, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or



each of

R'_{16} and R'_{17} is independently hydrogen; halo; alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by phenyl, hydroxy, carbamoyl, cycloalkyl of 5 or 6 carbon atoms, cyano or halo; alkoxy of 1 to 4 carbon atoms; alkoxy of 1 to 4 carbon atoms substituted by phenyl, hydroxy, carbamoyl, cycloalkyl of 5 or 6 carbon atoms, cyano or halo; phenoxy; —CO—Ro; —CO—O—Ro; —CO—NH—Ro; —CO—N(Ro)$_2$; —NH—CO—Ro; —SO_2—Ro; —SO_2—NH—Ro; —SO_2—N(Ro)$_2$; —NH—SO_2—Ro or



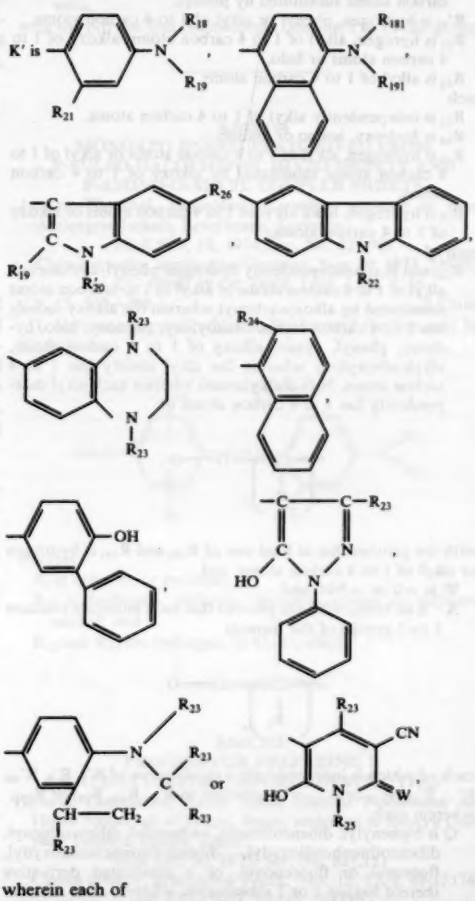
wherein each

Ro is independently alkyl of 1 to 4 carbon atoms or phenyl, or

R'_{16} and R'are on adjacent carbon atoms and taken together are —CH=CH—CH=CH—,

and

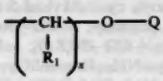
q is 0, 1 or 2,



wherein each of

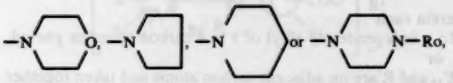
R_{18} and R_{19} is independently hydrogen; phenyl; cyclohexyl; alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by alkoxycarbonyl wherein the alkoxy moiety

has 1 to 4 carbon atoms, benzoyloxy, phenoxy, halo, hydroxy, phenyl, cyano, alkoxy of 1 to 4 carbon atoms, alkylcarbonyloxy wherein the alkyl moiety has 1 to 4 carbon atoms, N,N-dialkylamino wherein each alkyl independently has 1 to 4 carbon atoms or



with the proviso that when one of R_{18} and R_{19} is phenyl or cyclohexyl, the other is other than phenyl or cyclohexyl, or

R_{18} and R_{19} taken together and with the nitrogen atom to which they are joined are



wherein

Ro is alkyl of 1 to 4 carbon atoms or phenyl,

R'_{19} is phenyl, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by phenyl,

R'_{20} is hydrogen, phenyl or alkyl of 1 to 4 carbon atoms,

R_{21} is hyrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halo,

R_{22} is alkyl of 1 to 4 carbon atoms,

each

R_{23} is independently alkyl of 1 to 4 carbon atoms,

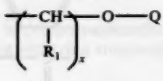
R_{24} is hydroxy, amino or anilino,

R_{25} is hydrogen, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by alkoxy of 1 to 4 carbon atoms,

R_{26} is hydrogen, halo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms,

each of

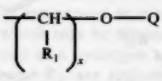
R_{181} and R_{191} is independently hydrogen; phenyl; cyclohexyl; alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4carbon atoms substituted by alkoxycarbonyl wherein the alkoxy moiety has 1 to 4 carbon atoms, benzoyloxy, phenoxy, halo, hydroxy, phenyl, cyano, alkoxy of 1 to 4 carbon atoms, alkylcarboxyloxy wherein the alkyl moiety has 1 to 4 carbon atoms, N,N-dialkylamino wherein each alkyl independently has 1 to 4 carbon atoms or



with the proviso that at least one of R_{181} and R_{191} is hydrogen or alkyl of 1 to 4 carbon atoms, and

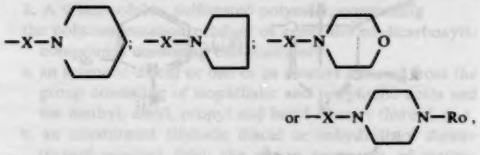
W is =O or =NH, and

A^- is an anion, with the proviso that each molecule contains 1 to 3 groups of the formula



each of which is independently a significance of R'_8, R'_9, R'_{10}, R'_{11}, R'_{12}, R'_{16} or R'_{17} or is attached to R_{18}, R_{19}, R_{181} or R_{191}, wherein each

Q is biphenylyl, dibenzofuranyl, carbazolyl, dibenzothienyl, dibenzothiophendioxydyl, dibenzothiophenmonoxydyl, fluorenyl or fluorenonyl, or a substituted derivative thereof having 1 or 2 substituents, wherein each substituent is independently hydroxy; halo; alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy; alkoxy of 1 to 4 carbon atoms; alkoxy of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy; cycloalkyl of 5 or 6 carbon atoms; cycloalkyl of 5 or 6 carbon atoms substituted by alkyl of 1 to 4 carbon atoms; trifluoromethyl; cyano; nitro; phenoxy; phenylazo; —CO—Ro; —CO—O—Ro; —O—CO—Ro; —CO—NH—Ro; —CO—N(Ro)$_2$; —NH—CO—Ro; —SO_2—Ro, —SO_2—NH—Ro, —SO_2—N(Ro)$_2$; —O—SO_2—N(Ro)$_2$;



wherein each

Ro is independently alkyl of 1 to 4 carbon atoms or phenyl, and

each

X is —CO— or —SO_2—,

each

R_1 is independently hydrogen, phenyl, cycloalkyl of 5 to 6 carbon atoms, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by halo, alkoxy of 1 to 4 carbon atoms or phenoxy, and each

x is 1, 2 or 3,

wherein each halo is independently chloro, bromo or iodo.

4,048,152

MODIFIED FORM OF DISAZO PIGMENT CI 20040

Joachim Ribka, Offenbach am Main; Wolfgang Rieper, Frankfurt am Main, and Siegfried Schwerin, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

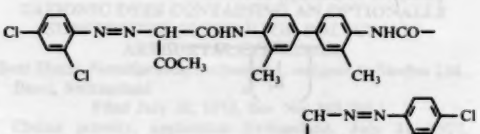
Continuation of Ser. No. 434,037, Jan. 17, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 631,122

Claims priority, application Germany, Jan. 19, 1973, 2302481

Int. Cl.[2] C09B *43/00*

U.S. Cl. 260—176 **1 Claim**

1. A disazo pigment of the formula



characterized by a specific surface of 10 - 20 m^2/g, a maximum of the grain size distribution of between 500 and 1000 nm with a proportion of these grain sizes in the total distribution of at least 30 % and by a proportion of the grain sizes exceeding 1000 nm of no more than 25 % in the total distribution.

4,048,153

AZO DYES HAVING AN OPTIONALLY SUBSTITUTED 1-AZO-3-NITRO-4-ARYLAMINOPHENYL NUCLEUS

Daniel Van Assche, Binningen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

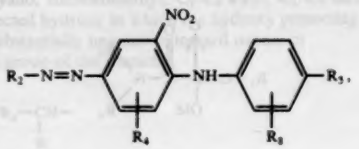
Continuation of Ser. No. 253,411, May 15, 1972, abandoned. This application Nov. 29, 1974, Ser. No. 528,357

Claims priority, application Switzerland, May 17, 1971, 7230/71

Int. Cl.[2] C09B *29/08, 29/32, 29/36, 31/04*

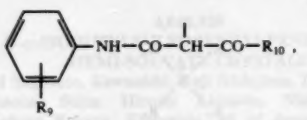
U.S. Cl. 260—193 25 Claims

1. A compound of the formula

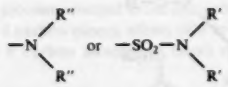


wherein

R_2 is phenyl, substituted phenyl, naphthyl, substituted naphthyl, substituted phenoxyphenyl, anilinophenyl, substituted anilinophenyl, phenylsulfinylphenyl, substituted phenylsulfinylphenyl, substituted phenylsulfonylphenyl, phenylazophenyl, substituted phenylazophenyl or



wherein each substituent of substituted phenyl, substituted naphthyl, substituted phenoxyphenyl, substituted anilinophenyl, substituted phenylsulfinylphenyl, substituted phenylsulfonylphenyl, and substituted phenylazophenyl is independently alkyl of 1 to 12 carbon atoms, alkyl of 1 to 12 carbon atoms substituted by halo, hydroxy, cyano, phenyl or naphthyl, alkoxy of 1 to 4 carbon atoms, sulfoalkoxy of 1 to 4 carbon atoms, phenylsulfonyl, naphthylsulfonyl, phenoxy, naphthyloxy, halo, nitro, alkoxycarbonyl wherein the alkoxy radical has 1 to 4 carbon atoms, sulfo, $—CONH_2$, carboxy, phenyl, naphthyl, cyclohexyl, alkylsulfonyl of 1 to 12 carbon atoms, phenylsulfonyloxy, p-tolylsulfonyloxy, benzoyloxy, trifluoromethyl, trichloromethyl,



wherein

R_9 is hydrogen, halo or alkoxy of 1 to 4 carbon atoms,

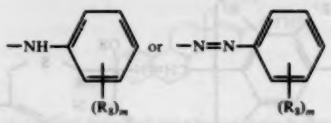
R_{10} is methyl or phenyl,

each R′ is independently hydrogen, alkyl of 1 to 4 carbon atoms, phenyl, naphthyl or cyclohexyl, and

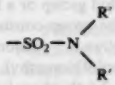
each R″ is independently hydrogen or alkyl of 1 to 4 carbon atoms,

R_4 is hydrogen, alkyl of 1 to 12 carbon atoms, alkoxy of 1 to 4 carbon atoms, halo, carboxy or alkoxycarbonyl wherein the alkoxy radical has 1 to 4 carbon atoms,

R_5 is



each R_8 is independently hydrogen acetamido, alkyl of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or naphthyl, alkoxy of 1 to 4 carbon atoms, phenyl, naphthyl, sulfo, halo, nitro or



wherein

each R′ is independently hydrogen, alkyl of 1 to 4 carbon atoms, phenyl, naphthyl or cyclohexyl, and

m is 0, 1 or 2,

wherein each halo is independently chloro, bromo, fluoro or iodo,

with the proviso that the molecule contains 1 to 2 sulfo groups.

4,048,154

MONOAZO DYESTUFFS DERIVED FROM P-SULFO-HALOPHENYL DIAZO MOIETY AND P-AMINO-O-ALKYL COUPLER MOIETY

Jochen Westphal, Dusseldorf, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

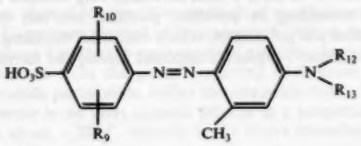
Filed Nov. 18, 1974, Ser. No. 524,989

Claims priority, application Germany, Nov. 20, 1973, 2357934

Int. Cl.[2] C09B *29/08;* D06P *1/06, 3/06, 3/16*

U.S. Cl. 260—205 2 Claims

1. Monoazo dyestuff which in the form of the free acid has the formula



wherein

R_9 is chlorine or bromine;

R_{10} is hydrogen, chlorine, bromine, cyano or trifluoromethyl; and

R_{12} and R_{13} are hydrogen or C_1–C_4-alkyl.

4,048,155

PROCESS FOR PREPARING 7 α-ALKOXYCEPHALOSPORIN DERIVATIVES

Hiroaki Yanagisawa; Akiko Ando; Masami Fukushima, and Hideo Nakao, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

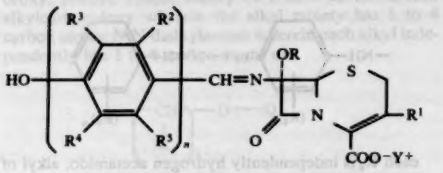
Filed Oct. 30, 1975, Ser. No. 627,111

Claims priority, application Japan, Nov. 15, 1974, 49-131761

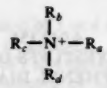
Int. Cl.[2] C07D *501/18, 501/36*

U.S. Cl. 542—422 7 Claims

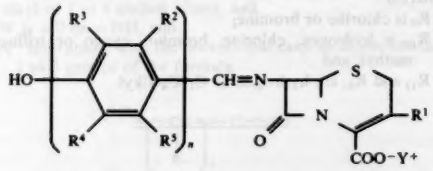
1. A process for the preparation of 7β-benzylideneamino-7α-alkoxy-3-cephem compounds having the formula



wherein R represents an alkyl group having 1–4 carbon atoms, R^1 represents a hydrogen atom, methyl group, cyanomethyl group, an acyloxymethyl group, carbamoyloxymethyl group, an alkoxymethyl group, an alkylthiomethyl group or a heterocyclic thiomethyl group selected from the group consisting of 2-pyridylthiomethyl, 1-methyl-1H-tetrazol-5-ylthiomethyl, 2-(1,3,5-triazolo)thiomethyl, 2-pyrazolothiomethyl, 1-imidazolinylthiomethyl and 5-methyl-1,3,4-thiadiazolyl-2-thiomethyl, R^2, R^3, R^4 and R^5 are the same or different and each represents a hydrogen atom or a straight or branched alkyl group having 1–4 carbon atoms, n is an integer of 1 or 2 and Y^+ is a cation selected from the group consisting of an alkali metal ion and an ammonium ion having the formula



wherein R_a, R_b, R_c and R_d can be the same of different and each represents, a hydrogen atom, a straight or branched alkyl group having 1–8 carbon atoms, a cycloalkyl group having 5–7 carbon atoms, phenyl group or a phenylalkyl group having 1–4 carbon atoms in the alkyl moiety, or R_a and R_b can be linked together with N to form a saturated heterocyclic ring selected from the group consisting of pyrrolidine, piperidine and morpholine, or R_a, R_b and R_c can be linked together with the N atom thereof to form a heteroaromatic ring selected from the group consisting os pyridine, picoline, lutidine, quinoline, quinaldine and pyrimidine, which comprises oxidizing a 7-benzylideneamino-3-cephem compound having the formula



wherein R^1, R^2, R^3, R^4, R^5, n and Y^+ are as defined above with an oxidizing agent selected from the group consisting of lead dioxide, manganese dioxide, dicyanodichlorobenzoquinone, tert.-butylhypochlorite, N-bromosuccinimide and N-chlorosuccinimide, and contacting the resulting oxidation product with an alkanol having 1–4 carbon atoms.

4,048,156

CARBAMOYLPHOSPHONATES

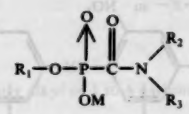
William P. Langsdorf, Jr., Wilmington, Del., assignor to E. I Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 553,423, Feb. 26, 1975, Pat. No. 3,997,544, which is a division of Ser. No. 283,769, Aug. 25, 1972, Pat. No. 3,846,512, which is a continuation-in-part of Ser. No. 85,221, Oct. 29, 1970, Pat. No. 3,819,353, which is a continuation-in-part of Ser. No. 803,962, March 3, 1969, abandoned, which is a continuation-in-part of Ser. No. 731,732, May 24, 1968, Pat. No. 3,627,507. This application Sept. 14, 1976, Ser. No. 723,332

Int. Cl.[2] C07F *9/40*

U.S. Cl. 260—239 A **1 Claim**

1. A compound of the formula



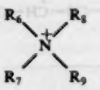
where

R_1 is alkyl of one through six carbon atoms, chloroalkyl of one through six carbon atoms containing up to three chlorine atoms, bromoalkyl of one through six carbon atoms, containing up to three bromine atoms, alkoxy alkyl of three through seven carbon atoms, alkenyl of two through six carbon atoms, alkynyl of three through four carbon atoms, phenyl or benzyl;

R_2 is hydrogen or methyl;

R_3 is hydrogen or methyl;

M is zinc or



where R_6 and R_7 can be taken together to form a ring that is $—(CH_2)_2—O—(CH_2)_2—$ or $—(CH_2)_n—$ where n is 2–6 and R_8 and R_9 are hydrogen.

4,048,157

4(FORMYLTHIO)-AZETIDIN-2-ONES AND OZONIZATION PROCESS THEREFOR

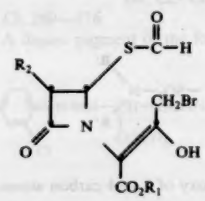
Robin D. G. Cooper, and Douglas O. Spry, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 29, 1975, Ser. No. 626,946

Int. Cl.[2] C07D *205/08*

U.S. Cl. 260—239 A **9 Claims**

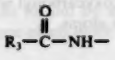
1. A compound of the formula



wherein:

R_1 is a readily removable carboxylic acid protecting group which is substantially unreactive toward ozone; and

R_2 is phthalamido or a group having the formula



wherein:

R_3 is

1. hydrogen, C_1–C_3 alkyl, halomethyl, benzyloxy, 4-nitrobenzyloxy, tert.-butyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy, 4-protected amino-4-protected carboxybutyl in which the amino protecting group and carboxy protecting group are substantially unreactive toward ozone; or
2. a group of the formula

$$R_4—(O)_m—CH_2—$$

wherein:

m is 0 or 1; and

R_4 is phenyl or phenyl substituted with 1 or 2 halogens, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, C_1–C_2 alkoxy, protected hydroxy in which the hydroxy protecting group is substantially unreactive toward ozone; or

3. a group of the formula

wherein:

R_4 is as defined above and

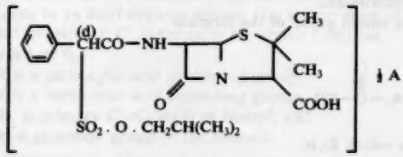
W is protected hydroxy, protected carboxy, or protected amino in which the hydroxy protecting group, the carboxy protecting group and the amino protecting group are substantially unreactive toward ozone.

4,048,158
D-α-ISOBUTYLSULFOBENZYLPENICILLIN HEMI-SOLVATE CRYSTALS

Keiichi Sugimoto, Kawanishi; Koji Nishijima, Ibaraki; Tadashi Hanaoka, Suita; Hiroshi Akimoto, Nishinomiya, and Nobuharu Kakeya, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 31, 1975, Ser. No. 645,913
Claims priority, application Japan, Jan. 20, 1975, 50-8998
Int. Cl.[2] C07D *499/62*
U.S. Cl. 260—239.1 **7 Claims**

1. Pure d-α-Isobutylsulfobenzylpenicillin hemi-solvate crystals of the formula



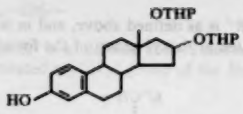
wherein A is a solvent selected from the group consisting of alcohols of 1 to 4 carbon atoms, ethers of 4 to 6 carbon atoms, ketones of 3 to 6 carbon atoms and esters of 3 to 6 carbon atoms.

4,048,159
TETRAHYDROPYRANYL ETHERS OF ESTROGENS

Pietro de Ruggieri, and Orazio Sighinolfi, both of Milan, Italy, assignors to Farmila Farmaceutici, Italy

Filed Nov. 19, 1975, Ser. No. 633,477
Claims priority, application Italy, Dec. 13, 1974, 30574/74
Int. Cl.[2] C07J *17/00*
U.S. Cl. 260—239.55 R **14 Claims**

1. Process for preparing a compound of the formula



which comprises debenzylating by catalytic hydrogenation the corresponding 3-benzyloxy-16α- or 16-β-, 17β-bis-(2'-tetrahydropyranyloxy) compound in an organic solvent.

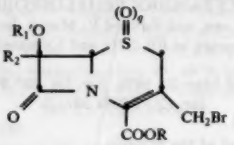
3. A compound comprising of 3-benzyloxy-17β-(2'-tetrahydropyranyloxy)-estra-1,3,5(10)-trien-16-one.

4,048,160
PROCESS FOR PREPARATION OF 7-ALKOXY-3-BROMOMETHYLCEPHEMS

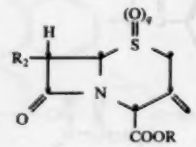
Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 22, 1976, Ser. No. 669,366
Int. Cl.[2] A61K *31/545*; C07D *501/04*
U.S. Cl. 544—21 **12 Claims**

1. A process for preparing a 3-bromomethylcephem compound of the formula



which comprises reacting a compound of the formula



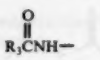
with from about 4 to about 8 equivalents of an alkali metal salt of a C_1–C_7 primary alcohol of the formula $R_1'OH$ in the presence of about 4 to about 8 equivalents of a positive brominating agent selected from the group consisting of bromine, DBU hydrobromide perbromide, iodine monobromide and tert-butyl hypobromite in an inert organic solvent at a temperature of −80° to about −20° C. wherein in the above formulae

q is 1 or 0;

R is a carboxylic acid protecting group;

R_1' is primary C_1–C_6 alkyl or benzyl; and

R_2 is an amido group of the formula



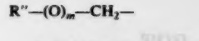
wherein R_3 is

a. hydrogen, C_1–C_3 alkyl, halomethyl, 3-(2-chlorophenyl)-5-methylisoxazol-4-yl or 4-protected amino-4-protected carboxybutyl;

b. benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, tert-butoxy, or 4-methoxybenzyloxy;

c. the group —R'' wherein R'' is 1,4-cyclohexadienyl, phenyl or phenyl substituted with 1 or 2 substituents independently selected from the group consisting of halo, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_3 alkyl, and C_1–C_7 alkoxy;

d. an arylalkyl group of the formula

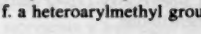


wherein R'' is as defined above, and *m* is 0 or 1;

e. a substituted arylalkyl group of the formula

wherein R''' is R'' as defined above, 2-thienyl or 3-thienyl, and W is protected hydroxy or protected amino; or

f. a heteroarylmethyl group of the formula



wherein R'''' is 2-thienyl, 3-thienyl, 2-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl, or 4-isoxazolyl;

with the limitation that when R''' or R'''' is 2-thienyl, 3-thienyl or 2-furyl the reaction is carried out at a temperature below about −40° C. and a halogen quenching agent is added before the mixture is allowed to warm above about 0° C.

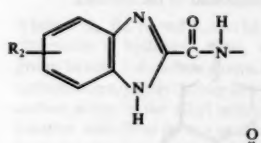
4,048,161

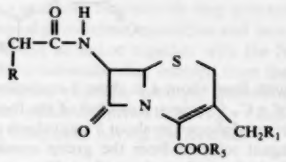
7-[α-(BENZIMIDAZOL-2-YLCARBONYLAMINO)-ARYLACETAMIDOCEPHALOSPORINS

William H. W. Lunn, and Edward V. Mason, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed May 20, 1976, Ser. No. 687,976
Int. Cl.[2] C07D *501/20*
U.S. Cl. 544—27 **16 Claims**

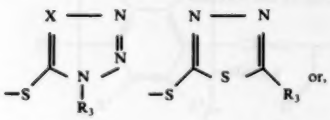
1. A compound of the formula

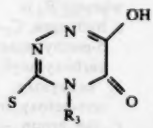




in which R is phenyl, monohydroxyphenyl, dihydroxyphenyl, monohalophenyl, monohydroxy substituted monohalophenyl, thienyl, or furyl;

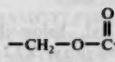
R_1 is





in which, in any of the above, X is =CH— or =N—, and R_3 is hydrogen or C_1–C_4 alkyl;

R_2 is hydrogen, C_1–C_3 alkyl, C_1–C_3 alkoxy, chloro, bromo, or fluoro; and R_5 is hydrogen, indanyl, phthalidyl, an acyloxymethyl group of the formula



in which Y is C_1–C_4 alkyl or phenyl, or, when R_5 is hydrogen, the pharmaceutically acceptable non-toxic salts thereof.

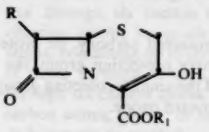
4,048,162

PROCESS FOR PREPARING 3-HYDROXY CEPHALOSPORINS

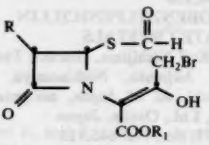
Stjepan Kukolja, and Charles F. Murphy, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 29, 1975, Ser. No. 626,683
Int. Cl.[2] C07D *501/02, 501/08*
U.S. Cl. 544—22 **10 Claims**

1. A process for preparing a 3-hydroxycephalosporin of the formula



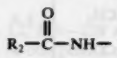
which comprises reacting a compound of the formula



with an amine selected from the group consisting of 1,5-diazabicyclo[5.4.0]undec-5-ene and 1,5-diazabicyclo[3.4.0]non-5-ene at a temperature of from about 0° C. to about 25° C., in which, in the above formulae, R_1 is a carboxylic acid protecting group, and R is

a. phthalimido,

b. an amido group of the formula

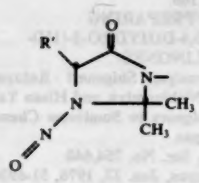


in which R_2 is

1. hydrogen, C_1–C_3 alkyl, halomethyl, thienyl-2-methyl, 4-protected-amino-4-protected carboxybutyl, benzyloxy, 4-nitrobenzyloxy, t-butyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy;
2. a group of the formula R'—$(O)_m$—CH_2— in which *m* is 0 or 1, and R' is phenyl or phenyl substituted with 1 or 2 halogens, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, or C_1–C_2 alkoxy;
3. a group of the formula

in which R' is as defined above and W is protected hydroxy, protected carboxy, or protected amino; or

c. an imidazolidinyl group of the formula



in which R' is as defined above.

4,048,163

PROCESS FOR PREPARATION OF 7-ALKOXY-3-CHLOROMETHYLCEPHEMS

Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

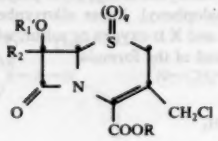
Filed Mar. 22, 1976, Ser. No. 669,368

The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.

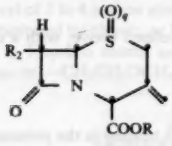
Int. Cl.[2] C07D *501/04*; A61K *31/545*

U.S. Cl. 544—21 **10 Claims**

1. A process for preparing a 3-chloromethylcephem compound of the formula



which comprises reacting a compound of the formula



with from about 1 to about 5 equivalents of an alkali metal salt of a primary C_1–C_7 alcohol of the formula $R_1'OH$ in the presence of from about 1 to about 5 equivalents of tert-butyl hypochlorite in an inert organic solvent at a temperature of about −80° to about 0° C., wherein in the above formulae

q is 1 or 0;

R is a carboxylic acid protecting group;

R is a carboxylic acid protecting group;

R_1' is primary C_1–C_6 alkyl or benzyl; and

R_2 is an amido group of the formula

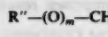
wherein R_3 is

a. hydrogen, C_1–C_3 alkyl, halomethyl, 3-(2-chlorophenyl)-5methylisoxazol-4-yl or 4-protected amino-4-protected carboxybutyl;

b. benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, tert-butoxy, or 4-methoxybenzyloxy;

c. the group —R'' wherein R'' is 1,4-cyclohexadienyl, phenyl or phenyl substituted with 1 or 2 substituents independently selected from the group consisting of halo, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_3 alkyl, and C_1–C_7 alkoxy;

d. an arylalkyl group of the formula

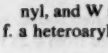


wherein R'' is as defined above, and m is 0 or 1;

e. a substituted arylalkyl group of the formula

wherein R''' is R'' as defined above, 2-thienyl or 3-thienyl, and W is protected hydroxy or protected amino; or

f. a heteroarylmethyl group of the formula



wherein R'''' is 2-thienyl, 3-thienyl, 2-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl; or 4-isoxazolyl.

4,048,164

N'-SUBSTITUTED DERIVATIVES OF 4'-(N-PIPERAZINYLMETHYL)SPIRO DIBENZOCYCLOHEPTADI- (OR TRI-) ENE-5,2'-DIOXOLANE(1',3')

Claude P. Fauran; Guy M. Raynaud; Michel J. Turin, all of Paris, and Janine M. Thomas, Neuilly (Hauts de Siene), all of France, assignors to Delalande S.A., Courbevoie, France

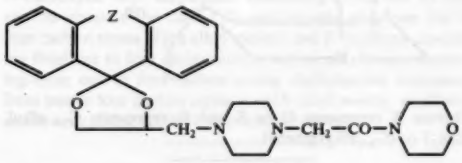
Continuation-in-part of Ser. No. 263,409, June 16, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,609

Claims priority, application France, June 18, 1971, 69.22226

Int. Cl.[2] C07D *413/14*

U.S. Cl. 544—121 **3 Claims**

1. A compound of the formula



wherein Z is $—CH_2CH_2—$ or —CH=CH—, and the pharmacologically acceptable acid addition salts thereof.

4,048,165

MANUFACTURE OF 1-SUBSTITUTED OXIMINO CYCLO ALKENES-(1)

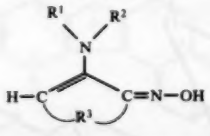
Hans-Martin Weitz, Frankenthal; Kurt Kahr, Neustadt, and Rolf Fischer, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Germany

Filed Aug. 11, 1975, Ser. No. 603,440

Int. Cl.[2] C07D *295/12*

U.S. Cl. 544—166 **7 Claims**

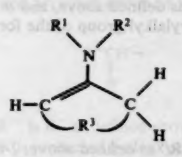
1. A process for the manufacture of 1-substituted oximino cycloalkenes-(1) of the formula



I

in which R^1 and R^2 are the same or different and individually denote an alkyl of from 1 to 8 carbon atoms or form, together with the adjacent nitrogen atom, members of a 5- or 6-membered heterocyclic ring selected from the group consisting of morpholino-, piperidino-, pyrrolidino-, piperazino-, imidazolidino-, pyrrolino-(Δ2'), and imidazolo-, and R^3 is alkyl-

ene of from 2 to 10 carbon atoms, which comprises: reacting cycloalkenes of the formula



II

wherein R^1, R^2 and R^3 have the meanings stated above, with from 1 to 2.5 moles of nitrogen monoxide and from 0.25 to 1 mole of oxygen per mole of starting material II in organic solvents which are inert under the conditions of the reaction.

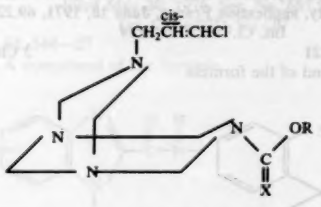
4,048,166

3-CARBOALKOXY (OR PHENOXY) AND 3-THIOCARBO-(3-CHLORO-2-PROPENYL)-1,3,5,7-TETRAAZABICYCLO(3.3.1)NONANE AND PREPARATION

Albertha M. Paul, Holliston, Mass., and Charles E. Moppett, Mystic, Conn., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 11, 1976, Ser. No. 741,089
Int. Cl.² C07D *257/10, 519/00*
U.S. Cl. 544—215 **5 Claims**

1. A compound corresponding to the formula



wherein X represents O or S and R represents C_{1-4} alkyl, phenyl or (C_{1-4} alkyl)phenyl.

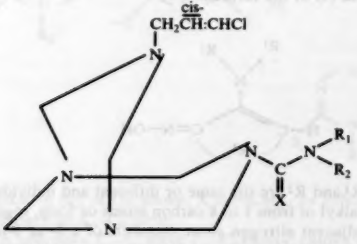
4,048,167

N,N-DISUBSTITUTED DERIVATIVES OF 3-CARBOXAMIDE OR 3-THIOCARBOXAMIDE-7-(3-CHLORO-2-PROPENYL)-1,3,5,7-TETRAAZABICYCLO(3.3.1)NONANE AND PREPARATION II

Albertha M. Paul, Holliston, Mass., and Charles E. Moppett, Mystic, Conn., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 11, 1976, Ser. No. 741,090
Int. Cl.² C07D *257/10, 519/00*
U.S. Cl. 544—215 **7 Claims**

1. A compound corresponding to the formula



wheren X represents O or S and R_1 and R_2 each represents lower alkyl, phenyl or (lower alkyl)phenyl.

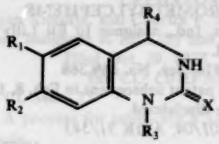
4,048,168

PROCESS FOR PREPARING 1-POLYHALOALKYL-3,4-DIHYDRO-2-(1H)-QUINAZOLINONES

Michihiro Yamamoto, Nishinomiya; Shigenari Katayama, Takarazuka; Masao Koshiba, Nishinomiya, and Hisao Yamamoto, Kobe, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

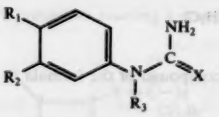
Filed Dec. 27, 1976, Ser. No. 754,640
Claims priority, application Japan, Jan. 23, 1976, 51-6920
Int. Cl.² C07D *239/82*
U.S. Cl. 260—251 QB **4 Claims**

1. A process for preparing a 3,4-dihydro-2(1H)-quinazolinone derivative of the formula,



(I)

wherein R_1 and R_2 are each independently hydrogen, lower alkyl, lower alkylthio or lower alkoxy, or, when taken together, R_1 and R_2 may form methylenedioxy; R_3 is polyhalo-lower alkyl; R_4 is phenyl, halophenyl, lower alkoxyphenyl, lower alkylphenyl or thienyl; and X is oxygen or sulfur, which comprises reacting a compound of the formula,



(II)

wherein R_1, R_2, R_3 and X are as defined above, with a compound of the formula,

(III)

wherein R_4 is as defined above, with heating in the presence of a zinc halide, optionally in an inert solvent.

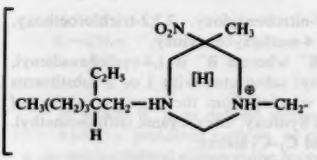
4,048,169

1,3-BIS-(β-ETHYLHEXYL)-5-NITRO-5-METHYL-HEXAHYDROPYRIMIDINE-NAPHTHALENE-1,5-DISULPHONATE

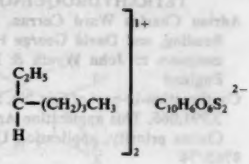
Fritz-Walter Lange, Gauting; Gert Haffner, Laupheim, and Jens Müller, Gauting, all of Germany, assignors to MEDITEST Institut fur medizinisch pharmazeutische Untersuchungen GmbH, Neu-Ulm, Germany

Division of Ser. No. 544,217, Jan. 27, 1975, Pat. No. 4,010,160.
This application Nov. 8, 1976, Ser. No. 739,427
Int. Cl.² C07D *239/04*
U.S. Cl. 260—251 R **1 Claim**

1. 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine-naphthalene-1,5-disulphonate of the formula



-continued

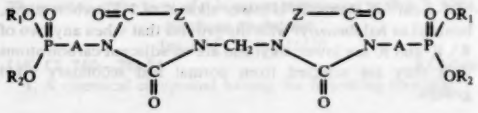


4,048,170
DIALKOXYPHOSPHONOALKYL DERIVATIVES OF DIHYDROURACILS

Daniel Porret, Binninen, and Jürgen Habermeier, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 574,798, May 5, 1975, Pat. No. 3,978,076, which is a division of Ser. No. 419,313, Nov. 27, 1973, Pat. No. 3,892,765. This application July 8, 1976, Ser. No. 703,406
Claims priority, application Switzerland, Dec. 12, 1972, 18030/72
Int. Cl.² C07D *239/54*
U.S. Cl. 260—256.4 E **6 Claims**

1. A dialkoxyphosphonoalkyl derivative of the formula



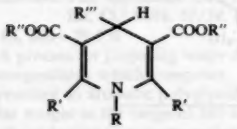
wherein Z is ethylene, or ethylene substituted by alkyl of 1 to 4 carbon atoms, R_1 and R_2 is alkyl of 1 to 4 carbon atoms, alkenyl of 3 to 4 carbon atoms, or wherein said alkyl or alkenyl is substituted by chloro, or R_1 and R_2 together form an alkylene of 2 to 5 carbon atoms, and A is alkylene of 1 to 12 carbon atoms, or $—CH_2CH_2OCH_2CH_2—$.

4,048,171
1,4-DIHYDROPYRIDINES

Friedrich Bossert, Wuppertal-Elberfeld, and Wulf Vater, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 5, 1971, Ser. No. 113,038
Claims priority, application Germany, Feb. 5, 1970, 2005116
Int. Cl.² C07D *211/84*
U.S. Cl. 260—256.4 C **39 Claims**

1. A compound of the formula:



wherein

R is hydrogen, alkyl of 1 to 4 carbon atoms or benzyl;

R′ is alkyl of 1 to 4 carbon atoms;

R″ is alkenyl of 3 or 4 carbon atoms or alkinyl of 3 or 4 carbon atoms; and

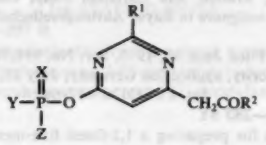
R‴ is cyclohexyl; phenyl unsubstituted or substituted by 1 to 3 groups selected from the group consisting of nitro, chlorine, bromine, 1 to 3 methoxy moieties, trifluoromethyl, carbomethoxy, carboxy and 1 or 2 hydroxymethylene moieties; pyridyl; thienyl; pyrrolyl; N-methylpyrrolyl; and dimethoxypyrimidyl.

4,048,172
CARBONYLMETHYLPYRIMIDIN-6-YL PHOSPHATES AND PHOSPHOROTHIONATES

Graham Paul Cotterrell, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 451,368, March 14, 1974, Pat. No. 3,932,631. This application July 24, 1975, Ser. No. 598,879
Claims priority, application United Kingdom, Mar. 29, 1973, 15159/73
Int. Cl.² C07F *9/65*
U.S. Cl. 260—256.5 R **4 Claims**

1. A compound of formula:



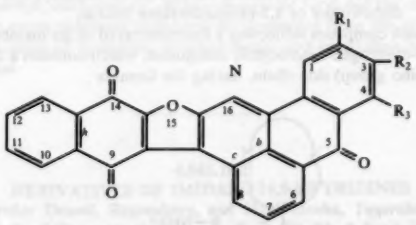
wherein X is oxygen or sulphur; Y is alkoxy containing from one to four carbon atoms, alkylamino containing from one to four carbon atoms, or dialkylamino containing from one to four carbon atoms in each alkyl moiety; Z is alkoxy containing from one to four carbon atoms; R^1 is alkyl containing from one to four carbon atoms, phenyl, chlorophenyl, alkylamino containing from one to four carbon atoms, dialkylamino containing from one to four carbon atoms in each alkyl moiety, or N-carboxylic acyl alkylamino containing from one to four carbon atoms in the carboxylic acyl moiety and from one to four carbon atoms in the alkyl moiety; and R^2 is alkoxy containing from one to four carbon atoms, amino, alkylamino containing from one to four carbon atoms, dialkylamino containing from one to four carbon atoms in each alkyl moiety, or alkenyl amino containing three to five carbon atoms.

4,048,173
HETEROCYCLIC POLYNUCLEAR PIGMENTS AND PROCESS FOR PREPARING SAME

Giuseppe Ribaldone, Gallarate (Varese), and Giampiero Borsotti, Novara, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 2, 1976, Ser. No. 663,151
Claims priority, application Italy, Mar. 6, 1975, 20988/75
Int. Cl.² C09B *5/14*
U.S. Cl. 260—272 **7 Claims**

1. A compound having the formula:



wherein R_1, R_2 and R_3 may be the same or different and are selected from the class consisting of H, Cl and OCH_3.

6. A process for preparing a compound having the formula of claim **1**, characterized in that a substituted or unsubstituted 1-aza-2-hydroxybenzanthrone is reacted with 2,3-dichloro-1,4-naphthoquinone in the presence of pyridine at a temperature

between 80° and about 120° C, a substantially stoichiometric molar ratio of the reactants being employed.

4,048,174

PROCESS FOR PREPARING 1,2-FUSED-1,3-DINITROGEN-HETEROCYCLIC COMPOUNDS

Artur Botta, Krefeld, and Christian Rasp, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 30, 1975, Ser. No. 591,789

Claims priority, application Germany, July 23, 1974, 2435406

Int. Cl.² C07C *487/04*

U.S. Cl. 260—283 SY **13 Claims**

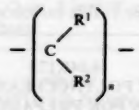
1. Process for preparing a 1,2-fused five-membered or six-membered 1,3-dinitrogen-heterocyclic compound having the formula

(I)

wherein

A is an arylene radical and

B is unsubstituted or halogen, lower alkyl, CF_3, alkoxy, aryloxy or dialkylamino substituted alkylene chain



wherein

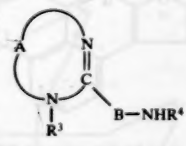
R^1 and R^2 individually represent hydrogen and/or unsubstituted or halogen, lower alkyl, CF_3, alkoxy, aryloxy or dialkylamino substituted aliphatic, cycloaliphatic, araliphatic or aromatic radicals and

n represents a number from 3 to 6, or

B is unsubstituted or a halogen, lower alkyl, CF_3 alkoxy, aryloxy or dialkylamino substituted 1,8-naphthylene, 2,2'-diphenylene or 4,5-phenanthrylene radical,

which comprises subjecting a five-membered or six-membered 1,3-dinitrogen-heterocyclic compound, which contains a 2-(ω-amino group) side chain, having the formula

(II)



wherein

A and B have the meanings indicated above and

R^3 and R^4 are hydrogen, lower alkyl, cycloalkyl or aralkyl but at least one of the two radicals R^3 and R^4 must represent hydrogen to a temperature of 150° to 400° C.

4,048,175

TETRAHYDROQUINOLINE DERIVATIVES

Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

Continuation-in-part of Ser. No. 554,259, Feb. 28, 1975, Pat. No. 3,991,065. This application Apr. 2, 1976, Ser. No. 673,173

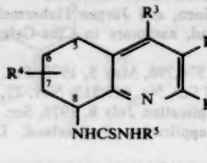
Claims priority, application United Kingdom, Mar. 5, 1974, 9763/74

Int. Cl.² C07D *215/40*

U.S. Cl. 260—283 S **4 Claims**

1. A compound of formula I

(I)



and pharmaceutically acceptable acid addition salts thereof, wherein R^1, R^2 and R^3 are the same or different and represent hydrogen, or a lower alkyl of 1–6 carbon atoms, R^4 represents hydrogen or substitution at the 5, 6 or 7-position by lower alkyl of 1–6 carbon atoms, R^5 is lower alkanol of 2–7 carbon atoms, benzoyl or halobenzoyl with the proviso that when any two of R^1, R^2 and R^3 are lower alkyl and are on adjacent carbon atoms then they are selected from normal and secondary alkyl groups.

4,048,176

2-(3-METHYL-4-PHENYL-1,2,3,4-TETRAHYDRO-2-ISOQUINOLYL)-ACETAMIDOXIME DIHYDROCHLORIDE

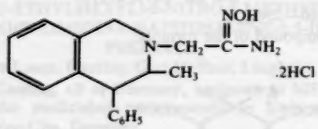
Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed July 23, 1976, Ser. No. 708,066

Int. Cl.² C07D *217/04*

U.S. Cl. 260—286 R **1 Claim**

1. A compound of the formula:



4,048,177

CERTAIN 2-SUBSTITUTED 4-PHENYLQUINOLINE-4-OLS

Robin Michael Black, Porton, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Filed Jan. 7, 1976, Ser. No. 647,278

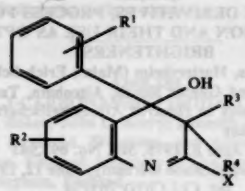
Claims priority, application United Kingdom, Jan. 16, 1975, 1932/75

Int. Cl.² C07D *215/22, 215/38*

U.S. Cl. 260—288 R **7 Claims**

1. A 4-phenylquinolin-4-ol selected from the group consisting of compounds having the formula (I)

(I)



and the pharmaceutically acceptable acid addition salts thereof, wherein R^1 and R^2, which may be the same or different, each represent hydrogen, lower alkyl, lower alkoxy, trifluoromethyl or halogen, R^3 and R^4, which may be the same or different, each represent lower alkyl and X represents hydrazino, amino, (lower)alkylamino, or di(lower)alkylamino, with the proviso that R^3 and R^4 cannot be groups which give rise to steric hindrance.

4,048,178

NOVEL N-ALLYL AND N-PROPARGYL BENZMORPHAN DERIVATIVES

Maxwell Gordon, Elkins Parks, and John J. Lafferty, Levittown, both of Pa., assignors to SmithKline & French Laboratories, Philadelphia, Pa.

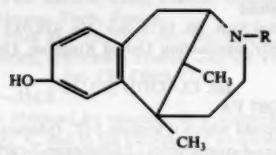
Filed Mar. 10, 1960, Ser. No. 13,982

The portion of the term of this patent subsequent to Oct. 3, 1984, has been disclaimed.

Int. Cl.[2] C07D *221/26*

U.S. Cl. 260—293.54 **3 Claims**

1. A chemical compound having the following formula:



In which R is a member selected from the group consisting of carbethoxy, formyl, carbomethoxy and carbobenzoxy.

4,048,179

PROCESS FOR PREPARING WATER-DILUTABLE, HEAT-CURING COATING COMPOSITIONS

Kwan Ting Shen, Lakewood, N.J.; John Allister Gannon, Danbury, Conn., and Robert Charles Nelson, Middletown, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 532,141, Dec. 12, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,728

Int. Cl.[2] C08L *61/24, 61/28, 63/02*

U.S. Cl. 260—29.4 R **18 Claims**

1. A process for preparing water-dilutable, heat-curing coating compositions which comprises

a. reacting an aromatic polyglycidyl ether having a molecular weight in the range of 360 to 500 with a polyethylene glycol having an average molecular weight in the range of 400 to 800 in the presence of 0 to 20% by weight of a polyhydric phenol to form a water-dilutable, hydroxy-containing adduct, wherein the moles of aromatic polyglycidyl ether to combined moles of polyethylene glycol plus polyhydric phenol are in the ratio of 1.0/1.0 to 3.0/1.0 and wherein the moles of polyethylene glycol to moles of polyhydric phenol are in the ratio of 1.0/0.0 to 1.0/1.5,

b. adding 5 to 50% by weight of solids of an aminoplast curing agent, and

c. diluting with water to bring the total percent solids in the range of 10 to 80% by weight and to yield a stable, aqueous composition containing no particles larger in size than 0.1 micron.

4,048,180

PYRIDYL-TETRAHYDROPYRANS AND PROCESS FOR PREPARING SAME

Roy Dennis Bowden, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 804,993, March 6, 1969, Pat. No. 3,651,071. This application Aug. 24, 1971, Ser. No. 174,522

Claims priority, application United Kingdom, Mar. 18, 1968, 13008/68; Dec. 20, 1968, 60714/68; Dec. 20, 1968, 60715/68; Dec. 20, 1968, 60716/68

Int. Cl.[2] C07D *405/04*

U.S. Cl. 260—297 R **7 Claims**

1. A compound selected from the group consisting of 4-(4′-pyridyl)-tetrahydropyran, 2-(2′-pyridyl)-tetrahydropyran, 4-(2′-pyridyl)-tetrahydropyran, and 4-(3′-pyridyl)-tetrahydropyran.

4,048,181

DERIVATIVES OF MERCAPTOPYRIDINE-1-OXIDE

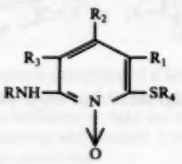
Miriam Lois Douglass, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,436

Int. Cl.[2] C07D *213/40*

U.S. Cl. 260—294.8 G **7 Claims**

1. A mercaptopyridine-1-oxide compound having the following structural formula:



wherein R is selected from the group consisting of the acyl radical $R_6C{=}O$ and the alkoxycarbonyl radical R_6-$OC{=}O$, where R_6 is a C_1–C_6 alkyl, aryl selected from the class consisting of phenyl or naphthyl or aralkyl, said alkyl having portion 1–6 carbons or halobenzyl; R_1, R_2 and R_3 are each independently selected from the group consisting of hydrogen, methyl, two of said terms may repreent methoxy and the other hydrogen, one of said terms may represent ethyl, n-butyl, methoxy, ethoxy, phenyl, bromophenyl, chlorophenyl, trichlorophenyl, naphthyl, chlorobenzyl, dichlorobenzyl or furyl and the other two terms represent hydrogen; R_4 is selected from the group consisting of hydrogen, an alkali metal, and an alkaline earth metal.

4,048,182

DERIVATIVES OF IMIDAZO [4,5-b]PYRIDINES

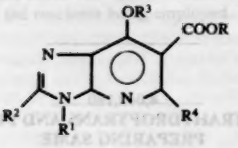
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 665,754, March 11, 1977, Pat. No. 4,003,908. This application Oct. 29, 1976, Ser. No. 736,986

Int. Cl.[2] C07D *471/04*

U.S. Cl. 260—295.5 B **6 Claims**

1. A compound of the formula



wherein
R is hydrogen or lower alkyl;
R^1 is hydrogen, lower alkyl, phenyl, phenyl-lower alkyl or cyclo-lower alkyl;
R^2 is hydrogen, lower alkyl, phenyl or phenyl-lower alkyl;
R^3 is di-lower alkylamino-lower alkyl;
R^4 is hydrogen, lower alkyl or phenyl;
and physiologically acceptable salts thereof.

4,048,183

1,3,5-TRISUBSTITUTED-1,2,4-TRIAZOLE COMPOUNDS

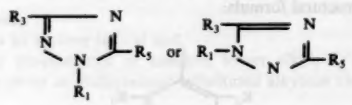
John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 599,504, July 28, 1975, Pat. No. 3,978,054, which is a division of Ser. No. 527,992, Nov. 29, 1974, Pat. No. 3,928,361, which is a division of Ser. No. 361,914, May 21, 1973, Pat. No. 3,882,134. This application Apr. 2, 1976, Ser. No. 672,899

Int. Cl.² C07D *401/14*

U.S. Cl. 260—296 R **4 Claims**

1. A compound of the formula



wherein R_1 is a pyridyl substituted lower alkyl;
R_3 is pyridyl; and
R_5 is pyridyl.

4,048,184

6-PHENYL-2H-PYRAZOLO[3,4-B]PYRIDINES

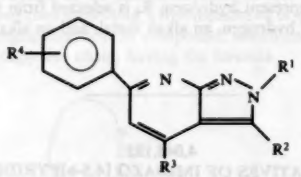
Hans Hoehn, Tegernheim, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 15, 1976, Ser. No. 741,572

Int. Cl.² C07D *471/04*

U.S. Cl. 260—296 H **9 Claims**

1. A compound of the formula



wherein
R^1 is lower alkyl, phenyl, phenyl-lower alkyl or cyclo-lower alkyl;
R^2 is hydrogen, lower alkyl or phenyl;
R^3 is lower alkylamino of di(lower alkylamino);
R^4 is hydrogen, halogen, hydroxy, lower alkoxy or amino;
and physiologically acceptable acid addition salts thereof.

4,048,185

BENZOXAZOLE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND THEIR USE AS OPTICAL BRIGHTENERS

Ulrich Pintschovius, Hattersheim (Main); Erich Schinzel, Hofheim, Taunus, and Günter Rosch, Altenhain, Taunus, all of Germany, assignors to Hoechst Atiengesellschaft, Frankfurt am Main, Germany

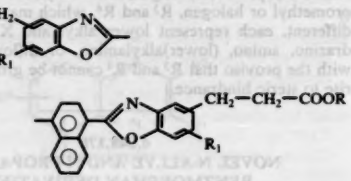
Filed June 8, 1976, Ser. No. 693,941

Claims priority, application Germany, June 12, 1975, 2526230

Int. Cl.² C07D *263/54*

U.S. Cl. 260—307 D **2 Claims**

1. A compound of the formula



wherein
R is hydrogen, ethoxyethyl, methyl, ethyl, propyl or butyl and
R_1 is hydrogen or methyl.

4,048,186

ANTIBACTERIAL SUBSTITUTED AZETIDINONES

Allan Guildford Brown, Cranleigh, and Thomas Trefor Howarth, Rudgwick, both of England, assignors to Beecham Group Limited, England

Filed Sept. 30, 1975, Ser. No. 618,013

Claims priority, application United Kingdom, Oct. 28, 1974, 46626/74

Int. Cl.² C07D *263/18*

U.S. Cl. 260—307 FA **1 Claim**

1. The compound which is sodium 3-[2′-(phenoxyacetoxy)ethyl]-7-oxo-1-aza-4-oxabicyclo[3,2,0]heptane-2-carboxylate.

4,048,187

5-(2-HYDROXYPHENYL)TETRAZOLYL COMPOUNDS

Brian Anderson; Raymond Frederick Dalton, and Philip Martin Rowbotham, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

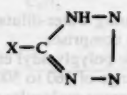
Filed May 25, 1976, Ser. No. 689,931

Claims priority, application United Kingdom, June 9, 1975, 24629/75

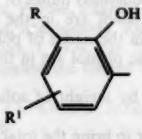
Int. Cl.² C07D *257/04*; C07F *1/08, 1/10, 1/12*

U.S. Cl. 260—308 D **6 Claims**

1. A heterocyclic compound of the formula



wherein X is a substituted o-hydroxyphenyl group of the formula



wherein R is hydrogen, halogen, nitro or alkyl and R^1 is hydro-

gen or alkyl, with the proviso that R and R^1 together contain from 5 to 18 aliphatic carbon atoms.

4,048,188

1-CARBONAMIDO IMIDAZOLES

Maurice W. Baker; John C. Kerry; Kenneth J. Nichol; John R. Marshall; David M. Weighton, and Antonin Kozlik, all of Nottingham, England, assignors to The Boots Company Limited, Nottingham, England

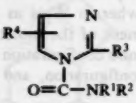
Division of Ser. No. 311,009, Nov. 30, 1972, Pat. No. 3,868,458. This application Jan. 22, 1975, Ser. No. 543,285

Claims priority, application United Kingdom, Dec. 7, 1971, 56781/71; July 26, 1972, 3498/72

Int. Cl.² C07D *233/56*

U.S. Cl. 548—341 **4 Claims**

1. A compound of the formula



in which R^3 is selected from the group consisting of hydrogen, methyl and ethyl, R^4 is an alkyl group selected from the group consisting of tert.butyl, sec.butyl, propyl, 1-ethylpropyl, isopropyl and tert.pentyl, and R^1 and R^2 are both methyl.

4,048,189

LIPOPHILIC PHTHALOCYANINES

Jean Andre Paul Kienzle, Creil, France, assignor to Pechiney Ugine Kuhlmann, Paris, France

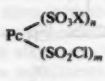
Filed Jan. 18, 1973, Ser. No. 324,715

Claims priority, application France, Jan. 20, 1972, 72.01855

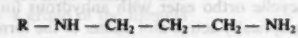
Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **6 Claims**

1. Product obtained by reacting, at a temperature between 50° C. and 100° C. and in the presence of an alkaline agent, one mole of phthalocyanine sulfochloride of the formula:



wherein Pc is phthalocyanine or copper phthalocyanine not more than one SO_2Cl or SO_3X group being present on each benzine ring of Pc, X is hydrogen or alkali metal, *n* is a whole number or a fraction from 0 to 2 inclusive, *m* is a whole number or a fraction from 2 to 4 inclusive, and the sum $m+n$ is equal to 3 or 4, with at least *m* moles of a propylenediamine or mixture of propylenediamines of the formula:



wherein R is linear alkyl or alkenyl containing 12 to 18 carbon atoms.

4,048,190

PREPARATION OF BISPHENOL-A BISIMIDES

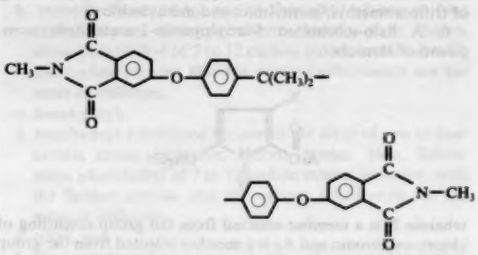
Donald S. Johnson, and Frank J. Williams, III, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,501

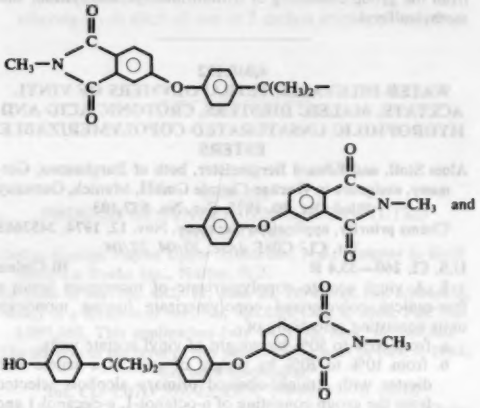
Int. Cl.² C07D *209/34*

U.S. Cl. 260—326 N **1 Claim**

1. The process for purifying a 4-isomer bisimide of the formula



which contains as impurities, at least one of an imide compound selected from the class consisting of



which process comprises dissolving at a temperature from 20° to 100° C. the aforementioned 4-isomer bisimide in methanol, for a period of time sufficient to take up in said solvent these impurities, and separating the purified 4-isomer bisimide substantially free of the impurities.

4,048,191

HALO-SUBSTITUTED 1-LOWERALKYL-5-AROYLPYRROLE-2-ACETIC ACID COMPOUNDS

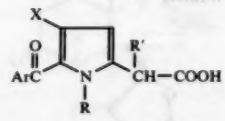
John Robert Carson, Norristown, Pa., assignor to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Filed June 27, 1975, Ser. No. 591,217

Int. Cl.² C07D *207/34*

U.S. Cl. 260—326.47 **12 Claims**

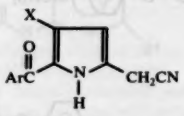
1. A halo-substituted 1-loweralkyl-5-aroylpyrrole-2-acetic acid compound of formula:



wherein X is a member selected from the group consisting of chloro and bromo, R is loweralkyl, R′ is a member selected from the group consisting of hydrogen and loweralkyl, and Ar is a member selected from the group consisting of phenyl and phenyl substituted with from one to three members each selected from the group consisting of halo, loweralkyl, loweralkoxy, trifluoromethyl, methylthio, and methylsulfinyl provided

that no more than two are selected from the group consisting of trifluoromethyl, methylthio, and methylsulfinyl.

6. A halo-substituted 5-aroylpyrrole-2-acetonitrile compound of formula:



wherein X is a member selected from the group consisting of chloro and bromo and Ar is a member selected from the group consisting of phenyl and phenyl substituted with from one to three members each selected from the group consisting of halo, loweralkyl, loweralkoxy, trifluoromethyl, methylthio, and methylsulfinyl provided that no more than two are selected from the group consisting of trifluoromethyl, methylthio, and methylsulfinyl.

4,048,192

WATER-DILUTABLE TETRAPOLYMERS OF VINYL ACETATE, MALEIC DIESTERS, CROTONIC ACID AND HYDROPHILIC UNSATURATED COPOLYMERIZABLE ESTERS

Alois Stoll, and Eduard Bergmeister, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Oct. 30, 1975, Ser. No. 627,103

Claims priority, application Germany, Nov. 12, 1974, 2453655

Int. Cl.[2] C08F *4/32, 20/04, 22/04*

U.S. Cl. 260—33.4 R **10 Claims**

1. A vinyl acetate copolymerizate of monomers being a free-radical polymerized copolymerizate having monomer units consisting essentially of

a. from 60% to 80% by weight of vinyl acetate units,

b. from 10% to 20% by weight of units of a maleic acid diester with straight-chained primary alcohols selected from the group consisting of n-octanol-1, n-decanol-1 and mixtures thereof,

c. from 5% to 20% by weight of units of a mono-olefinically unsaturated ester copolymerizable with vinyl acetate and having from 6 to 8 carbon atoms and a hydrophilic group selected from the group consisting of carboxyl groups, hydroxyl groups and keto groups, and

d. from 3% to 10% by weight of crotonic acid units; and the copolymers thereof neutralized by salt forming compounds.

4,048,193

PROCESS FOR BICYCLIC LACTONE DIALS

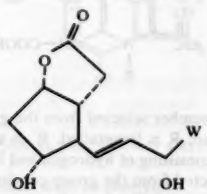
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 374,349, June 28, 1973, Pat. No. 3,904,648. This application June 4, 1975, Ser. No. 583,556

Int. Cl.[2] C07D *317/30*

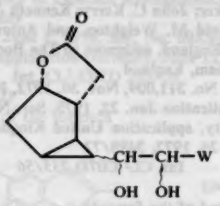
U.S. Cl. 260—343.3 R **6 Claims**

1. A process for preparing an optically active bicyclic lactone diol of the formula

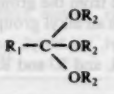


or a racemic compound of that formula and the mirror image thereof, wherein W is 1-pentyl, cis 1-pent-2-enyl, or 1-pent-2-ynyl, and ~ indicated attachment of the hydroxyl to the side chain in alpha or beta configuration, which comprises the steps of

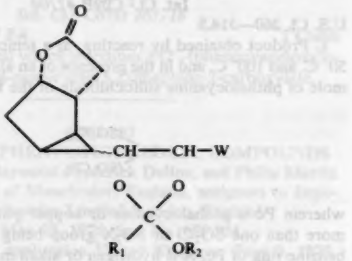
a. reacting an optically active tricyclic lactone glycol of the formula



or a racemic compound of that formula and the mirror image thereof, wherein W is as defined above and ~ indicates attachment of the moiety to the cyclopropane ring in exo and endo configuration and to the side chain in alpha or beta configuration, and an ortho ester of the formula

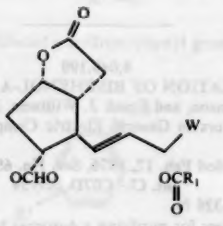


wherein R_1 is hydrogen, alkyl of 1 to 19 carbon atoms, inclusive, or aralkyl of 7 to 12 carbon atoms, inclusive, substituted with zero to 3 halo atoms; and R_2 is methyl or ethyl in the presence of an acid catalyst, to form an optically active cyclic ortho ester of the formula



or a racemic compound of that formula and the mirror image thereof, wherein R_1, R_2, W, and ~ are as defined above;

b. reacting said cyclic ortho ester with anhydrous formic acid to form an optically active diol diester of the formula



or a racemic compound of that formula and the mirror

image thereof, wherein R_1, W, and ~ are as defined above; and

c. replacing the acyl groups of said diol diester with hydrogen by alcoholysis in the presence of a base.

4,048,194

6α-METHOXY-4α-HYDROXY-2β-HYDROXYMETHYL-3α-TETRAHYDROPYRANACETIC ACID 4α γ-LACTONE ETHERS AND ACYLATES

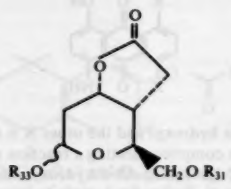
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 14, 1976, Ser. No. 676,893

Int. Cl.[2] C07D *493/04*

U.S. Cl. 260—343.6 **3 Claims**

1. A thromboxane intermediate of the formula



wherein R_{31} is a hydroxy-hydrogen replacing group selected from the group consisting of R_9, R_{10}, and R_{34};

wherein R_9 is an acyl protecting group selected from the group consisting of

a. benzoyl;

b. benzoyl substituted with one to 5 alkyl of one to 4 carbon atoms, inclusive, phenylalkyl of 7 to 12 carbon atoms, inclusive, or nitro, with the proviso that not more than 2 substituents are other than alkyl, and that the total number of carbon atoms in the subtituents does not exceed 10 carbon atoms, with the further proviso that the substituents are the same or different;

c. benzoyl substituted with alkoxycarbonyl of 2 to 5 carbon atoms; inclusive;

d. naphthoyl;

e. naphthoyl substituted with one to 9, inclusive, alkyl of one to 4 carbon atoms, inclusive, phenylalkyl of 7 to 10 carbon atoms, inclusive, or nitro, with the proviso that not more than 2 substituents on either side of the fused aromatic rings are other than alkyl and that the total number of carbon atoms in the substituents on either of the fused aromatic rings does not exceed 10 carbon atoms, with the further proviso that the various substituents are the same or different; and

f. alkanoyl of 2 to 12 carbon atoms, inclusive;

wherein R_{10} is a blocking group selected from the group consisting of

a. tetrahydropyranyl;

b. tetrahydrofuranyl; and

c. a group of the formula

$$-C(OR_{11})(R_{12})-CH(R_{13})(R_{14}),$$

wherein R_{11} is alkyl of one to 18 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl or phenyl substituted with one to 3 alkyl of one to 4 carbon atoms, inclusive, wherein R_{12} and R_{13} are alkyl of one to 4 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 alkyl or one to 4 carbon atoms, inclusive, or when R_{12} and R_{13} are taken together $-(CH_2)_2-$ or $-(CH_2)_b-O-(CH_2)_c$, wherein *a* is 3,4, or 5, or *b* is one, 2, or 3, and *c* is one, 2, or 3, with the proviso that *b* plus *c* is 2,3, or 4, with the further proviso that R_{12} and R_{13} may be the same or different, and wherein R_{14} is hydrogen or phenyl;

wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of

a. benzyl,

b. benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive, with the further proviso that the various substituents are the same or different,

c. benzhydryl,

d. benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive, with the further proviso that the various substituents are the same or different,

e. trityl, and

f. trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive, with the further proviso that the various substituents are the same or different; and

wherein R_{33} is alkyl of one to 5 carbon atoms, inclusive.

4,048,195

PROCESS OF SYNTHESIZING SUBSTITUTED INDANONES

Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

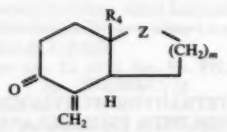
Division of Ser. No. 482,711, June 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application July 14, 1976, Ser. No. 705,302

The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.

Int. Cl.[2] C07D *309/12*; C07C *79/46, 69/76, 69/02*

U.S. Cl. 260—345.9 S **1 Claim**

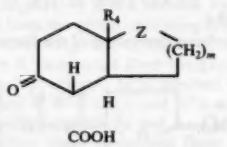
1. A process for the preparation of a compound of the formula



wherein

R_4 is hydrogen or lower alkyl; Z is $CH(OR_2)$; R_2 is tetrahydropyranyl, lower alkanoyl, benzoyl, nitrobenzoyl, or carboxy-benzoyl; *m* is an integer having the value of 1 or 2,

which comprises dissolving a compound of the formula



wherein

R_4, Z and *m* are as defined above in dimethylsulfoxide and then adding to the reaction mixture formaldehyde in the presence of a compound selected from the group consisting of methylamine, butylamine, benzylamine and heterocyclic secondary amines and salts thereof derived from strong mineral acids or organic acids.

4,048,196

MANUFACTURE OF BUTANEDIOL AND/OR TETRAHYDROFURAN FROM MALEIC AND/OR SUCCINIC ANHYDRIDE VIA γ- BUTYROLACTONE

Franz Josef Broecker, Ludwigshafen, and Matthias Schwarzmann, Limburgerhof, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Nov. 14, 1975, Ser. No. 631,911
Claims priority, application Germany, Nov. 23, 1974, 2455617
Int. Cl.² C07D *307/08, 31/18, 29/00*
U.S. Cl. 260—346.11 4 Claims

1. A process for the manufacture of 1,4-butanediol and/or tetrahydrofuran by catalytic hydrogenation of maleic anhydride and/or succinic anhydride (in the former case via succinic anhydride), with formation of γ-butyrolactone as an intermediate, wherein the improvement consists in

a. hydrogenating maleic anhydride or succinic anhydride in the presence of γ-butyrolactone over a catalyst containing nickel, to give γ-butyrolactone,

b. removing the water formed during the hydrogenation by separating γ-butyrolactone and water from succinic anhydride by distillation, recycling succinic anhydride and separating γ-butyrolactone and water by distillation, and

c. converting γ-butyrolactone into butanediol and/or tetrahydrofuran over a catalyst containing copper.

4,048,197

2,3,3',4'-BIPHENYLTETRACARBOXYLIC ACID DIANHYDRIDE

Hiroshi Itatani; Mikito Kashima; Masaoki Matsuda; Hataaki Yoshimoto, and Hiroyuki Yamamoto, all of Ichihara, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Division of Ser. No. 324,050, Jan. 19, 1973, Pat. No. 3,940,426.
This application July 21, 1975, Ser. No. 597,789
Claims priority, application Japan, Apr. 3, 1972, 47-32554; May 19, 1972, 47-49143
Int. Cl.² C07D *307/89*
U.S. Cl. 260—346.3 1 Claim

1. 2,3,3',4'-Biphenyltetracarboxylic acid dianhydride.

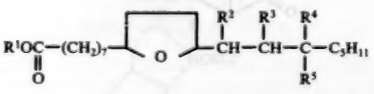
4,048,198

CERTAIN 8-(2-TETRAHYDROFURYL)OCTANOIC ACID COMPOUNDS WITH PROSTAGLANDIN LIKE BIOLOGICAL EFFECTS

Poul Nedenskov, Birkerod, and Karol Alster, Farum, both of Denmark, assignors to Aktieselskabet Grindstedvaerket, Arhus, Denmark

Continuation-in-part of Ser. No. 480,722, June 19, 1974, abandoned. This application May 17, 1976, Ser. No. 686,987
Claims priority, application United Kingdom, June 20, 1973, 29241/73
Int. Cl.² C07D *307/16*
U.S. Cl. 260—347.4 8 Claims

1. A tetrahydrofuran derivative of the formula



wherein R^1 represents hydrogen or a lower alkyl group, each of R^2 and R^3 represents hydrogen, or R^2 and R^3 together represents a further bond between the two carbon atoms, one of R^4 and R^5 represents hydrogen or a lower alkyl group and the other a hydroxy group, or R^4 and R^5 together represents an oxygen atom.

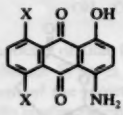
4,048,199

PRODUCTION OF AMINONITRODIHYDROXYANTHRAQUINONES BY PARTIAL REDUCTION DINITRODIHYDROXYANTHRAQUINONES

Wolfgang Elser, Wachenheim, and Gerhard Epple, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 543,246, Jan. 23, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,856
Claims priority, application Germany, Feb. 7, 1974, 2405812
Int. Cl.² C07C *49/68;* C09B *1/22*
U.S. Cl. 260—380 17 Claims

1. A process for the production of an aminonitrodihydroxyanthraquinone of the formula:



in which one X is hydroxyl and the other X is nitro, by partial reduction, which comprises heating a reaction mixture consisting essentially of 1,5-dinitro-4,8-dihydroxyanthraquinone, 1,8-dinitro-4,5-dihydroxyanthraquinone or a mixture thereof and a reductant selected from the group consisting of unsubstituted phenol, pyrogallol, resorcinol, hydroquinone, hydroquinone monomethyl ether, substituted phenol having on the phenyl nucleus besides the phenolic -OH one or more substituents selected from the group consisting of alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, halogen and amino and mixtures thereof, at from 80° to 250° C until one of the two nitro groups of each respective 1,5-dinitro-4,8-dihydroxyanthraquinone and 1,8-dinitro-4,5-dihydroxyanthraquinone is reduced to the amino group and the reduction product of the above formula is then separated.

4,048,200

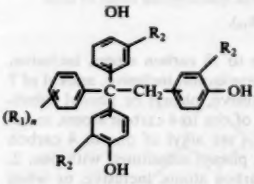
1,1,2-TRIS-(o/p-HYDROXYPHENYL)-1-PHENYL-ETHANES

Erhard Tresper; Dieter Neuray, and Dieter Freitag, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 24, 1976, Ser. No. 660,850
Claims priority, application Germany, Feb. 28, 1975, 2508710
Int. Cl.² C07C *39/16*
U.S. Cl. 260—395 4 Claims

1. Trisphenols [1,1,2-tris-(o/p-hydroxyphenyl)-1-phenylethanes] of the general formula (I):

(I)



wherein

R_1 and R_2, which may be the same or different, denote hydrogen, a C_1–C_{18} alkyl group, a cyclohexyl group or an optionally substituted C_6–C_{15} aryl group, a halogen or a nitro group, and

n represents an integer from 1 to 5.

4,048,201

NOVEL ENOL ESTERS

Alan Owen Pittet, Atlantic Highlands; Erich Manfred Klaiber, Neptune; Manfred Hugo Vock, Locust, all of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Joaquin Vinals, Red Bank, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 662,820, March 1, 1976, Pat. No. 4,000,329, which is a continuation-in-part of Ser. No. 620,355, Oct. 7, 1975, Pat. No. 4,000,090, which is a continuation-in-part of Ser. No. 507,412, Sept. 19, 1974, Pat. No. 3,940,499. This application Sept. 15, 1976, Ser. No. 723,536

Int. Cl.[2] C09F *5/08*

U.S. Cl. 260—410 9 Claims

1. "Cis" or "trans" or mixtures of "cis" and "trans" 2(2,2,6-trimethyl-1-cyclohexen-1-yl)ethen-1-ol ester defined by the structure:

wherein R_1 is C_1-C_{11} alkyl and R_4 is hydrogen or methyl.

6. The compound of claim 1 wherein R_1 is n-heptyl and R_4 is hydrogen.

4,048,202

3-O-ALKANOYLGLYCERIC ACIDS

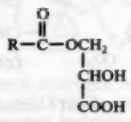
Charles I. Beck, Skokie, and Roger M. Layton, Buffalo Grove, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Apr. 11, 1975, Ser. No. 567,400

Int. Cl.[2] C11C *3/02*; C07C *69/02*

U.S. Cl. 260—410.6 7 Claims

1. A compound of the formula



(I)

wherein R is alkyl having from 1 to 20 carbon atoms, or alkenyl having from 10 to 20 carbon atoms, and the corresponding non-toxic pharmaceutically acceptable salts thereof.

4,048,203

PURIFICATION OF LUTEIN-FATTY ACID ESTERS FROM PLANT MATERIALS

Thomas Philip, 248 E. Adams St., Tucson, Ariz. 85705

Filed Dec. 6, 1976, Ser. No. 747,826

Int. Cl.[2] C11B *1/10, 7/00*

U.S. Cl. 260—412.8 9 Claims

1. A method of purifying lutein-fatty acid esters from plant materials containing lutein which comprises dissolving oleoresin, which contains said lutein-fatty acid ester, from such materials in hot alkanol containing not more than four carbon atoms and precipitating the lutein-fatty acid esters by cooling the solution, followed by removal of alkanol by filtration and drying the lutein-fatty acid esters under vacuum.

4,048,204

C20 AND C22 ACIDS TO PROMOTE WOUND HEALING

Kwan-Hua Lee, San Francisco, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 630,483, Nov. 10, 1975, abandoned, which is a continuation of Ser. No. 498,796, Aug. 19, 1974, abandoned, which is a continuation of Ser. No. 207,623, Dec. 13, 1971, abandoned. This application Sept. 10, 1976, Ser. No. 722,247

Int. Cl.[2] C11C *1/00*; C07C *61/38*

U.S. Cl. 260—413 1 Claim

1. An acid 2,6,6,-Trimethyl-1-(10'-carboxy-deca-1',3',5',7',9'-pentaenyl) cyclohex-1-ene.

4,048,205

PROCESS FOR SEPARATING AN ESTER OF A MONOETHANOID FATTY ACID

Richard W. Neuzil, Downers Grove, and Armand J. deRosset, Clarendon Hills, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 2, 1976, Ser. No. 710,829

Int. Cl.[2] C11C *1/08*

U.S. Cl. 260—428 27 Claims

1. A process for separating an ester of a monoethanoid fatty acid from a mixture comprising an ester of saturated fatty acid and an ester of an unsaturated fatty acid consisting essentially of an ester of a monoethanoid fatty acid which process comprises contacting at a temperature within the range of from about 20° C. to about 200° C. and a pressure within the range of from about atmospheric to about 500 psig. said mixture with an adsorbent comprising a X or a Y zeolite containing at exchangeable cationic sites copper cations and one or more second cations selected from the group consisting of sodium, potassium, rubidium and cesium, thereby selectively adsorbing said ester of a monoethanoid fatty acid and thereafter recovering said ester of a monoethanoid fatty acid.

4,048,206

PROCESS FOR THE PRODUCTION OF 1-ORGANYLSILATRANES AND CARBOFUNCTIONAL DERIVATIVES THEREOF

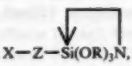
Mikhail Grigorievich Voronkov, ulitsa Lermontova, 315, kv. 32, and Valery Mikhailovich Dyakov, ulitsa Lermontova, 263, kv. 23, both of Irkutsk, U.S.S.R.

Filed Apr. 22, 1975, Ser. No. 570,493

Int. Cl.[2] C07F *7/18*

U.S. Cl. 260—448.8 R 7 Claims

1. A process for the production of a 1-organylsilatrane of the formula



where R is selected from the group consisting of $—CH_2—CH_2—$ and $—CH(CH_3)CH_2—$; Z is a bivalent hydrocarbon radical; X is selected from the group consisting of H, alkyl, aryl, F, Cl, Br, I, CF_3, CN, NH_2, SH, CNS, R^1M, $(R^2O)_2P(O)$ and $R^3C(O)M$, where R^1 is selected from the group consisting of alkyl, aryl, aralkyl or alkaryl; M is selected from the group consisting of O and S; R^2 is alkyl; and R^3 is selected from the group consisting of alkyl, aryl, R_F and $A—C_6H_4OCH_2$, where R_F is a fluorocarbon chain containing from 1 to 10 carbon atoms and A is selected from the group consisting of halogen, an alkyl group and an alkoxy group, which comprises reacting an amine of the formula

$N(ROH)_3$,

where R is selected from the group consisting of $—CH_2—CH_2—$ and $—CH(CH_3)CH_2—$, with a 1-organyltrialkoxysilane of the formula

$X - Z - Si(OR^4)_3$

where R^4 is alkyl; X is selected from the group consisting of H, alkyl, aryl, I, Br, Cl, F, CF_3, CN, NH_2, SH, CNS, R^3M, $(R^3O)_2P(O)$ and $R^3C(O)M$, where R^1 is selected from the group consisting of alkyl, aryl, aralkyl and alkaryl; M is selected from the group consisting of O and S; R^2 is alkyl; and R^3 is selected from the group consisting of alkyl, aryl, R_F and $A—C_6H_4OCH_3$, where R_F is a fluorocarbon chain containing from 1 to 10 carbon atoms and A is selected from the group consisting of halogen, an alkyl group and an alkoxy group, in the presence of a low-boiling polar organic solvent at 20° to 100° C. and subsequently recovering the desired product, and the amine is initially admixed with said solvent, after which the 1-organyltrialkoxysilane is added to the reaction mixture.

4,048,207

POLYMERIC MATERIALS WITH SILANE END GROUPS

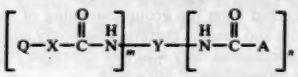
Frank N. Jones, Louisville, Ky., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 622,430, Oct. 14, 1975, which is a continuation-in-part of Ser. No. 329,156, Feb. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 133,424, April 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,533, May 21, 1970, abandoned. This application Nov. 5, 1976, Ser. No. 739,285

Int. Cl.² C07F 7/18

U.S. Cl. 260—448.8 R **8 Claims**

1. A polymeric material represented by the structure



where

Q is a non-resinous polymeric or copolymeric segment of

a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;

b. styrene or acrylonitrile;

c. a vinyl ester whose ester moiety contains 2–18 carbon atoms; or

d. a vinyl ether;

X is the residue of a chain transfer agent;

Y is the residue of a di-, tri-, or tetraisocyanate radical after removal of isocyanate groups;

A is the residue of a mercapto-, hydroxy- or aminoalkyl alkoxy silane radical; and

m and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined

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4,048,208

METHOD FOR PREPARING IMPROVED EXPANDED POLYSTYRENE SHEET

John P. Spicuzza, Jr., Pittsburgh, and Joseph M. Sutej, New Brighton, both of Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Dec. 31, 1975, Ser. No. 645,856

Int. Cl.² B29D 27/00

U.S. Cl. 264—45.3 **13 Claims**

1. In a process for producing microcellular expanded styrene polymer sheet by extruding a mixture containing styrene polymer, a blowing agent and a nucleating system, the improvement comprising extruding with said mixture about 0.002 to 2% of a hydrophilic silica and about 0.002 to 2% of an alkaline earth metal oxide, the percentages of hydrophilic silica and alkaline earth metal oxide being based on the total weight of styrene polymer and said hydrophilic silica and alkaline earth metal oxide being uniformly distributed throughout said mixture whereby said sheet has improved flexibility.

4,048,209

ISOMERIZATION OF THE CIS, TRANS ISOMERS OF 1,2,5,6-TETRASUBSTITUTED-1,5-CYCLOOCTADIENES TO THE CORRESPONDING CIS, CIS-ISOMERS

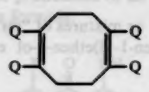
Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 642,097, Dec. 18, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,915

Int. Cl.² C07C 121/48, 69/74, 61/26, 103/19

U.S. Cl. 260—464 **6 Claims**

1. A process for the production of a 1,2,5,6-tetrasubstituted-cis,cis-1,5-cyclooctadiene of the formula



wherein each Q is individually selected from the group consisting of —CN, —COOH, $—CONH_2$, —COX and —COOR, wherein R is an alkyl group having from 1 to 4 carbon atoms and X is selected from the group consisting of Cl and Br, which comprises isomerizing the corresponding 1,2,5,6-tetrasubstituted-cis,trans-1,5-cyclooctadiene in the presence of an isomerization promoting amount of a halogen promoter selected from the group consisting of chlorine, bromine and iodine, at a temperature in the range of −50° to 100° C, for a time sufficient to effect said isomerization, in the absence of light.

4,048,210

TRANSCYANOHYDRINATION

Royston H. Davis, Rainham, England, assignor to Shell Oil Company, Houston, Tex.

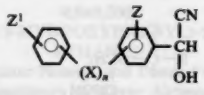
Filed June 2, 1976, Ser. No. 692,180

Claims priority, application United Kingdom, June 11, 1975, 25017/75

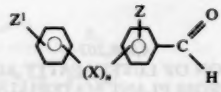
Int. Cl.² C07C 120/00, 121/66

U.S. Cl. 260—465 F **7 Claims**

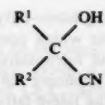
1. A process for making cyanohydrins having the formula:



where *n* is an integer between 0 and 1 inclusive, X is an oxygen or sulfur atom, Z and Z^1 each are independently hydrogen, alkyl, alkenyl, haloalkyl, alkoxy, aryl, cyano or nitro groups having up to 6 carbon atoms which comprises contacting at a temperature between 0° and 50° C at pressures up to 10 atmospheres and for a time ranging from about 10 minutes to about 24 hours a substantially water-insoluble aldehyde having the formula:



where *n*, X, Z and Z^1 are defined as above with a ketocyanohydrin having the formula:



where R^1 and R^2 are alkyl groups having 1 to 6 carbon atoms or R^1 and R^2 together are a 5 or 6 membered alkylene group, in

an inert organic solvent in the presence of an organic nitrogen-base wherein the molar ratio of ketocyanohydrin to aldehyde is between about 1 to about 15 and the base is present in an amount equal to about 5 to 50 wt percent based on the ketocyanohydrin.

4,048,211

MODIFICATION OF METHADONE SYNTHESIS PROCESS STEP

Charles J. Barnett, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 10, 1976, Ser. No. 685,034
Int. Cl.[2] C07C *120/00, 121/78*
U.S. Cl. 260—465 E **3 Claims**

1. In a process for preparing a mixture of 2,2-diphenyl-4-dimethylaminovaleronitrile and 2,2-diphenyl-3-methyl-4-dimethylaminobutyronitrile by the reaction of diphenylacetonitrile and 1-dimethylamino-2-chloropropane, the improvement which consists in carrying out the reaction in an inert polar, aprotic solvent having a dielectric constant greater than 28 at 25° C. by forming the sodium salt of diphenylacetonitrile with sodium hydroxide and then adding thereto 1-dimethylamino-2-chloropropane.

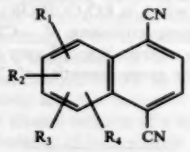
4,048,212

PROCESS FOR THE MANUFACTURE OF 1,4-DICYANONAPHTHALENES

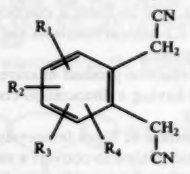
Leonardo Guglielmetti, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 629,180, Nov. 5, 1975, Pat. No. 4,011,261. This application Sept. 17, 1976, Ser. No. 724,142
Claims priority, application Switzerland, Nov. 14, 1974, 15190/74; Nov. 14, 1974, 15191/74
Int. Cl.[2] C07C *121/62*
U.S. Cl. 260—465 H **7 Claims**

1. A process for the manufacture of 1,4-dicyano-substituted bicyclic or tricyclic compounds of formula



wherein R_1 represents hydrogen, halogen, alkyl, alkoxy, carboxy, carbalkoxy, $—CONR_5R_6$, wherein each of R_5 and R_6 independently represents hydrogen or alkyl, or together they complete a 5- or 6-membered heterocyclic ring, sulpho-, $—SO_2NR_5R_6$, in which R_5 and R_6 are as defined hereinbefore, alkylsulphonyl, arylsulphonyl, cyano, nitro, or together with R_2 completes a 6-membered aromatic ring or represents the methylenedioxy radical, R_2 represents hydrogen, halogen, alkyl, alkoxy, carboxy, carbalkoxy, $—CONR_5R_6$, wherein R_5 and R_6 are as defined hereinbefore, alkylsulphonyl, nitro, or together with R_1 completes a 6-membered aromatic ring or represents the methylenedioxy radical, R_3 represents hydrogen, halogen or alkyl and R_4 represents hydrogen, halogen or alkyl, which process comprises reacting an o-xylene dicyanide of formua



wherein R_1, R_2, R_3 and R_4 are as defined hereinbefore, with glyoxal, in the presence of a base and a solvent, at temperatures below 50° C.

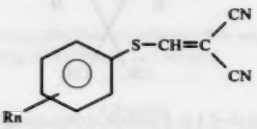
4,048,213

(((ARYL)THIO)METHYLENE)-PROPANEDINITRILES

Craig E. Mixan, and R. Garth Pews, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 15, 1976, Ser. No. 742,037
Int. Cl.[2] C07C *121/70*
U.S. Cl. 260—465 F **12 Claims**

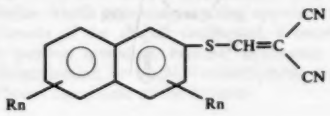
1. A compound of the formula



wherein

each R substituent individually represents F, Cl, Br, a straight or branched chain alkyl group, or an alkoxy group, said groups having from 1 to 4 carbon atoms, and *n* is an integer with a value of 0, 1 or 2.

11. A compound of the formula



wherein

each R substituent individually represents F, Cl, Br, a straight or branched chain alkyl group, or an alkoxy group, said groups having from 1 to 4 carbon atoms, and *n* is an integer with a value of 0, 1 or 2.

4,048,214

PRODUCTION OF ALICYCLIC UNSATURATED COMPOUNDS HAVING PENDENT FUNCTIONAL GROUPS

Günther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 250,533, May 5, 1972, Pat. No. 3,965,142, which is a continuation of Ser. No. 845,904, July 29, 1960, abandoned, which is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application Aug. 15, 1975, Ser. No. 605,367
Claims priority, application Germany, Sept. 29, 1965, 2443912
The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.
Int. Cl.[2] C07C *67/30*
U.S. Cl. 560—128 **1 Claim**

1. A process for preparing 3,7-cyclodecadiene carboxylic acid ethyl ester which comprises contacting butadiene and acrylic acid ethyl ester at a temperature of from about −10° to 200° C in the presence of a O-valent nickel complex combined with tri-(ortho phenyl phenyl) phosphite as the sole electron donor, the mol ratio of butadiene to acrylic acid ethyl ester being at least 2:1, the reaction being carried out for a period of time sufficient to prepare said 3,7-cyclodecadiene carboxylic acid ethyl ester.

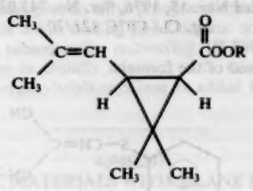
4,048,215

PROCESS FOR PREPARATION OF TRANS-CHRYSANTHEMATES

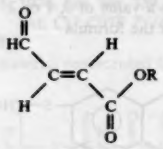
Alain Krief, Boninne, and László Hevesi, Jambes, both of Belgium, assignors to Roussel Ulcaf, Paris, France

Filed Apr. 5, 1976, Ser. No. 673,458
Claims priority, application Belgium, Apr. 7, 1975, 155168
Int. Cl.² C07C *67/30*
U.S. Cl. 560—124 **6 Claims**

1. A process for the preparation of an ester of the formula



wherein R is alkyl of 1 to 6 carbon atoms comprising reacting at least 2 molar equivalent of a triphenyl isopropyl phosphonium halide based on the 4-oxo-2E-butenoate with a strong base and reacting the resulting ylide with an alkyl 4-oxo-2E-butenoate of the formula



4,048,216

PROCESS FOR THE MANUFACTURE OF DICYANOBUTENE

Dhafir Yusuf Wadden, Wilton, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 8, 1976, Ser. No. 721,507
Claims priority, application United Kingdom, Oct. 1, 1975, 40136/75
Int. Cl.² C07C *120/02*
U.S. Cl. 260—465.3 **16 Claims**

1. A process for the manufacture of dicyanobutene which comprises reacting butadiene with hydrogen cyanide in the molar ratio of 1:10 to 10:1 and oxygen or an oxygen-containing gas with oxygen in molar excess in relation to whichever of the hydrogen cyanide and butadiene is used in the smaller molar amount, in the presence of a catalyst comprising copper ions and halide ions and of a solvent for the catalyst at a temperature of 10° to 150° C and a pressure of 0.2 to 50 bar, the amount of copper ion and the amount of halide ion being from 0.001 to 0.2 mole per mole of butadiene.

4,048,217

2-METHYL-3-NITROBENZOIC ACID ESTERS

Otto Rohr, Therwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 9, 1975, Ser. No. 594,471
Claims priority, application Switzerland, July 15, 1974, 9702/74
Int. Cl.² C07C *79/46*
U.S. Cl. 560—20 **5 Claims**

1. 2-Methyl-3-nitrobenzoic acid allyl ester.

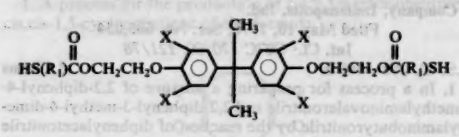
4,048,218

FLAME RETARDANT MERCAPTOCARBOXYLIC ACID ESTERS OF HALOGENATED AROMATIC POLYOLS

Charles R. Morgan, Brookeville, and David E. Kramm, Laurel, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,674
Int. Cl.² C07C *149/20, 149/22*
U.S. Cl. 560—147 **2 Claims**

1. As a composition of matter, a halogen-containing polythiol of the formula



wherein X is a halogen selected from the group consisting of Cl and Br, and R_1 is an alkyl group containing 1–16 carbon atoms.

4,048,219

ACETALS DERIVED FROM NEGATIVELY SUBSTITUTED ALDEHYDES AND POLYNITRO- OR HALONITROETHANOLS

Horst G. Adolph, Beltsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 461,554, April 17, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 640,091
Int. Cl.² C07C *69/66*
U.S. Cl. 560—156 **3 Claims**

1. A compound which is $RO_2CCH(OR)_2$ wherein R is selected from the group consisting of $—CH_2CYZ(NO_2)$ and $—CH_2C(NO_2)_2CH_3$ wherein Y and Z vary independently and are selected from the group consisting of Cl, F, and NO_2.

4,048,220

PROCESS FOR PREPARATION OF 1,4-HALOALLYLIC ESTERS FROM DIENES

Carlos G. Cardenas, Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,112
Int. Cl.² C07C *67/04, 67/24, 67/28*
U.S. Cl. 560—237 **9 Claims**

1. In a process for the synthesis of 1,4-haloallylic esters from C_4–C_8 conjugated alkadienes which comprises reacting the conjugated alkadiene, a halogenating agent and a carboxylic acid, said carboxylic acid being a compound selected from the group consisting of alkanoic acids having one to eight carbon atoms, and benzoic acid to form a reaction product mixture containing 1,4-and 1,2-halocarboxylates and 1,4-haloethers, the improvement comprising;

a. adding to said reaction product mixture a catalytic amount of strong acid having a dissociation constant above about 1×10^{-3}; and

b. stirring the mixture at room temperature to 100° C. for a sufficient period of time to convert a substantial portion of the 1,2-halocarboxylate product and haloethers in the reaction mixture to the 1,4-halocarboxylate product.

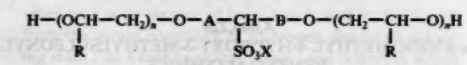
4,048,221

DIOLS CONTAINING SULPHONIC ACID GROUPS BASED ON DIHYDROXY ALKENES

Gerhard Dieter Wolf, Dormagen; Francis Bentz, Cologne, and Gunther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 4, 1975, Ser. No. 555,228
Claims priority, application Germany, Mar. 7, 1974, 2410862
Int. Cl.² C07C *143/42, 143/10;* C08G *63/12*
U.S. Cl. 260—512 C 2 Claims

1. Dihydroxy sulphonates containing ether groups and corresponding to the general formula



in which,

A and B, which may be the same or different, represent straight-chain or branched alkylene radicals with 1 to 6 carbon atoms, the total number of carbon atoms in A and B being from 3 to 7,

R represents hydrogen C_1–C_4-alkyl or phenyl,

X represents NH_4 or an alkali metal, and

n is a number from 1 to 30.

4,048,222

PROCESS FOR PREPARING TRANS-4-AMINOMETHYL-CYCLOHEXANE-1-CARBOXYLIC ACID

Tsuyoshi Saito, and Kiro Asano, both of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1974, Ser. No. 447,794
Int. Cl.² C07C *99/00*
U.S. Cl. 260—514 J 10 Claims

1. A process for preparing trans-4-aminomethylcyclohexane-1-carboxylic acid which comprises simultaneously reducing and trans-isomerizing, for 0.5 to 20 hours, at a pressure of 20–200 Kg/cm², at a temperature of 70°–200° C, in the presence of a ruthenium catalyst, 5–50% by weight of solvent of p-aminomethylbenzoic acid or a derivative thereof in an aqueous solution or an alkanol solution of a strong acid selected from the group consisting of hydrochloric acid, sulfuric acid, phosphoric acid, formic acid, acetic acid and mixtures thereof as a solvent, said alkanol having 1 to 6 carbon atoms.

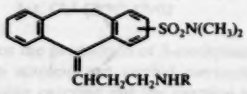
4,048,223

3-DIMETHYLSULFAMOYL-5-[AMINO(ALKYL OR ALKYLIDENE)]-5H-DIBENZO [A,D]CYCLOHEPTENES

Edward L. Engelhardt, Gwynedd Valley, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 567,166, April 11, 1975, which is a division of Ser. No. 297,710, July 25, 1963, Pat. No. 3,922,305, which is a continuation-in-part of Ser. No. 215,770, Aug. 9, 1962, abandoned, which is a continuation-in-part of Ser. No. 140,223, Sept. 25, 1961, abandoned, which is a continuation-in-part of Ser. No. 120,835, May 24, 1961, abandoned. This application Oct. 6, 1976, Ser. No. 729,939
Int. Cl.² C07C *143/72, 143/84*
U.S. Cl. 260—556 AR 2 Claims

1. A compound selected from the group consisting of:



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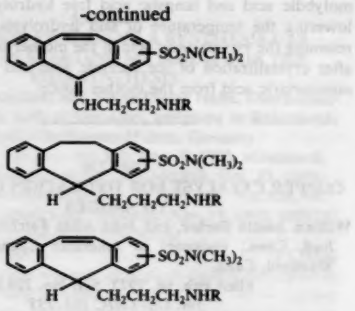


and acid addition salts thereof wherein R is selected from the group consisting of hydrogen and methyl.

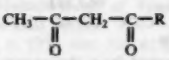
4,048,224

PROCESS FOR RESOLVING ALANINE, 3-FLUORO AND 2-DEUTERO-3-FLUORO-DL-ALANINE

John M. Chemerda, and George Gal, both of Watchung, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 5, 1976, Ser. No. 664,328
Int. Cl.² C07C *101/10;* A61K *31/195*
U.S. Cl. 260—534 C 5 Claims

1. The process for resolving a DL-mixture of an alanine compound which is alanine, 3-fluoroalanine, or 2-deutero-3-fluoro alanine which comprises reacting approximately equimolar amounts of the alanine compound, a resolving base which is quinine, quinidine, brucine, strychnine, d-α,N,N-trimethylbenzylamine, or 1-α,N,N-trimethylbenzylamine, and a β-dicarbonyl compound of the formula



wherein R is methyl, phenyl or alkoxy of 1–5 carbon atoms, in a solution of a lower alkanol of 1–5 carbon atoms at reflux for ½–3 hours, and separating the salt parts of the diastereomers by crystallization, then treating both separately, first with an alkali metal hydroxide, then with H_3O^+, and recovering the respective individual isomers.

4,048,225

PROCESS FOR THE PRODUCTION OF PURE RACEMIC ACID AND MESOTARTARIC ACID

Gunter Prescher, and Gerd Schreyer, both of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Feb. 24, 1976, Ser. No. 660,789
Claims priority, application Germany, Sept. 29, 1975, 2543333
Int. Cl.² C07C *59/14*
U.S. Cl. 260—536 30 Claims

1. A process for the production of pure racemic acid and mesotartaric acid comprising reacting an alkali maleate with aqueous hydrogen peroxide in a molar ratio of hydrogen peroxide to maleate of greater than 1:1 and also in the presence of (1) an alkali molybdate or (2) a mixture of an alkali molybdate and an alkali tungstate as a catalyst to form the alkali metal salt of cis-epoxysuccinic acid in solution, passing the reaction solution thus formed over a strongly acidic cation exchanger to form free cis-epoxysuccinic acid and free (1) molybdic acid or (2) a mixture of free molybdic acid and free tungstic acid, hydrolyzing the free cis-epoxysuccinic acid to form a hydrolysis mixture containing racemic acid and mesotartaric acid, removing the (1) molybdic acid or (2) mixture of molybdic acid and tungstic acid with an anion exchanger, crystallizing out the racemic acid from the (1) molybdic acid or (2) mixture of

molybdic acid and tungstic acid free hydrolysis mixture by lowering the temperature of said hydrolysis mixture while retaining the mesotartaric acid in the mother liquor remaining after crystallization of the racemic acid and recovering the mesotartaric acid from the mother liquor.

4,048,226

COPPER CATALYST FOR HYDRATION OF NITRILES TO AMIDES

William Austin Barber, and John Allan Fetchin, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Feb. 16, 1972, Ser. No. 226,863
Int. Cl.[2] C07C *103/133*
U.S. Cl. 260—561 N **2 Claims**

1. In a process for hydration of acrylonitrile to acrylamide wherein acrylontrile and water are reduced in contact with a solid heterogeneous catalyst comprising elemental copper as the active catalytic agent, the improvement wherein said copper catalytic agent consists esstentially of reduced copper produced by reduction of a copper sulfate salt in aqueous solution with a borohydride reducing agent in aqueous alkaline solution.

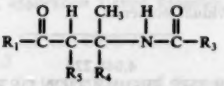
4,048,227

N-(OXOPROPYL)AMIDE DERIVATIVES

Syed K. Mowdood, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 548,481, Feb. 10, 1975, abandoned, which is a continuation of Ser. No. 355,628, April 30, 1973, abandoned, which is a continuation of Ser. No. 159,046, July 1, 1971, abandoned. This application Mar. 3, 1976, Ser. No. 663,391
Int. Cl.[2] C07C *103/42, 103/62, 103/80*
U.S. Cl. 260—562 P **3 Claims**

1. An amide selected from the group consisting of N-(1,3-diphenyl-1-methyl-3-oxo-propyl)acetamide, N-(1,3-diphenyl-1-methyl-3-oxo-propyl)-4′-(salicyloyl)benzamide, N-(1,3-diphenyl-1-methyl-3-oxo-propyl)benzamide and amides having the structure:



where R_3 is selected from methyl, ethyl, propyl, pentyl, hexyl, heptyl and octyl radicals, where R_1 is a radical selected from 2′-hydroxy benzophenone, 4′-octyl benzophenone, 2′-hydroxy-4′-octyl benzophenone and ortho hydroxy-p-octyl phenyl, R_4 is selected from the radicals of R_1 and from aliphatic hydrocarbon radicals having 1–8 carbon atoms and R_5 is selected from hydrogen and methyl radicals.

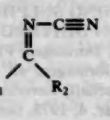
4,048,228

SUBSTITUTED CYANAMIDIC COMPOUNDS

James P. Shoffner, Elk Grove Village, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 611,581, Sept. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 358,285, May 7, 1973, abandoned. This application Jan. 12, 1977, Ser. No. 758,617
Int. Cl.[2] C07C *119/00*
U.S. Cl. 260—566 R **6 Claims**

1. A substituted cyanamidic compound having the general formula:



in which R_1 and R_2 are selected from the group consisting of hydrogen, aryl, alkyl having from 1 to about 30 carbon atoms, cycloalkyl having from 5 to 12 carbon atoms in the ring, alkyl-substituted cycloalkyl, aryl-substituted cycloalkyl, aralkyl, and alkaryl radicals.

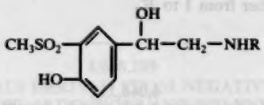
4,048,229

α-AMINOMETHYL-4-HYDROXY-3-METHYLSULFONYL BENZYL ALCOHOLS

Donald F. Colella, West Norriton, Pa., and Carl Kaiser, Haddon Heights, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Jan. 8, 1975, Ser. No. 539,492
Int. Cl.[2] C07C *91/18*
U.S. Cl. 260—570.6 **5 Claims**

1. A chemical compound of the formula:



or a pharmaceutically acceptable acid addition salt of said compound, wherein:

R is straight or branched chain lower alkyl of from 1 to 6 carbon atoms, cycloalkyl or cycloalkylmethyl, the cycloalkyl moiety having from 3 to 6 carbon atoms, $XC_6H_4CH_2CH(CH_3)$, $XC_6H_4CH_2C(CH_3)_2$ or $XC_6H_4CH_2CH_2\,CH(CH_3)$; and

X is hydrogen, hydroxy or methoxy.

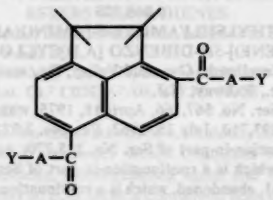
4,048,230

AMINOACETYL-ACENAPHTHENES

Arthur D. Sill, and Francis W. Sweet, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed Dec. 21, 1972, Ser. No. 317,248
Int. Cl.[2] C07C *97/10*
U.S. Cl. 260—570.5 C **5 Claims**

1. A 3,6-bis-basic ketone of acenaphthene having the formula:

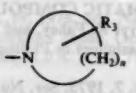


wherein A is a straight or branched alkylene chain having from 1 to 6 carbon atoms; and Y is selected from the group consisting of:

a.

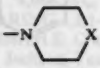
wherein R_1 and R_2 are individually selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, alkenyl having from 3 to 6 carbon atoms in which the unsaturation is in a position other than the 1-position of the alkenyl group;

b.



wherein n is an integer of from 4 to 6, and R_3 is selected from the group consisting of hydrogen, lower alkyl having from 1 to 4 carbon atoms, phenyl and benzyl in which said R_3 group is linked to any of the heterocyclic carbon atoms;

c.



wherein X is selected from the group consisting of oxygen and NR_4, in which R_4 represents hydrogen or a lower alkyl group having from 1 to 4 carbon atoms; and the pharmaceutically acceptable salts thereof.

4,048,231

4-[3-(SUBSTITUTED AMINO)-2-HYDROXYPROPOXY]-5,6,7,8-TETRAHYDRO-1,6,7-NAPHTHALENETRIOLS

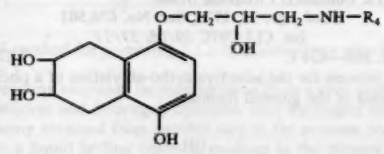
Frederic P. Hauck, Somerville; Michael E. Condon, Lawrenceville, and Rita T. Fox, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 9, 1976, Ser. No. 656,769

Int. Cl.² C07C *93/06*

U.S. Cl. 260—570.7 **5 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof wherein R_4 is lower alkyl having 1 to 4 carbon atoms.

4,048,232

PROCESS FOR THE PRODUCTION OF 3-METHYLMERCAPTOPROPIONALDEHYDE

Edgar Koberstein, Alzenau; Klaus Muller, and Ferdinand Theissen, both of Grossauheim, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

Filed Sept. 20, 1973, Ser. No. 399,127

Claims priority, application Germany, Apr. 21, 1973, 2320544

Int. Cl.² C07C *47/02*

U.S. Cl. 260—601 R **8 Claims**

1. In a process for the production of 3-methylmercaptopropionaldehyde from acrolein and methyl mercaptan the improvement comprising carrying out the reaction in the presence of hexamethylenetetramine as a catalyst.

4,048,233

PROCESS FOR PREPARING A SYNTHESIS GAS SUITABLE AS STARTING MATERIAL FOR THE OXO-SYNTHESIS

Jurgen Falbe, Dinslaken, and Heinz-Dieter Hahn, Oberhausen-Sterkrade-Nord, both of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany

Continuation of Ser. No. 421,318, Dec. 3, 1973, abandoned, which is a continuation of Ser. No. 869,898, Oct. 27, 1969, abandoned. This application Dec. 2, 1975, Ser. No. 636,790

Claims priority, application Germany, Nov. 19, 1968, 1809727

Int. Cl.² C07C *45/02*

U.S. Cl. 260—604 HF **4 Claims**

1. In an oxo process wherein an olefin is hydroformylated to an oxygen-containing product having one or more carbon atom than said olefin, and wherein after recovery of said product there remains a thick oil residue comprising aldehydes, alcohols, acetals, aldols and esters, the improved method of converting said thick oil to useful product comprising cracking said thick oil over a supported nickel catalyst containing in the range of 2 to 25 weight percent nickel in the presence of in the range of 1.5 to 2.5 moles water vapor and 1.6 to 3.0 moles carbon dioxide per g-atom in said thick oil, and at a temperature in the range of 600° C to 900° C and a pressure in the range up to 30 atmospheres, recovering from the material so cracked a synthesis gas mixture consisting essentially of carbon monoxide and hydrogen, and controlling the amount and properties of said water vapor and carbon dioxide used to yield a hydrogen/carbon monoxide ratio in said synthesis gas mixture in the approximate range of 1:1 to 2:1 and recycling said hydrogen and carbon monoxide to said oxo process.

4,048,234

SULPHONES

Pierre Chabardès, Sainte Foy les Lyon; Marc Julia, Paris, and Albert Menet, La Mulatiere, all of France, assignors to Rhone-Poulenc S.A., Paris, France

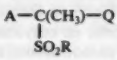
Filed Nov. 6, 1973, Ser. No. 413,246

Claims priority, application France, Nov. 8, 1972, 72.39513

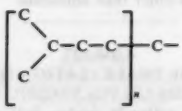
Int. Cl.² C07C *147/06*

U.S. Cl. 260—607 AR **13 Claims**

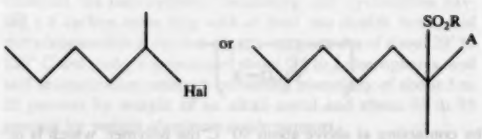
1. A sulphone of the formula:



in which R is substituted or unsubstituted aryl, A is a radical having the carbon skeleton



in which n is 1 to 3 and which contains an odd number of hydrogen atoms from $8n + 1$ to $10n + 3$, such that the said radical is saturated, unsaturated, or of the conjugated or unconjugated polyene type, and which may contain a 2,6,6-trimethylcyclohex-1-enyl radical when n is 2 or 3, and Q is hydrogen, a radical within the aforesaid definition of A, or a radical of formula:



where Hal is halogen, R and A are as hereinbefore defined, and the indicated bonds are single or double.

4,048,235

PROPENYLOXY BENZENE COMPOUNDS

Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 340,806, March 13, 1973, abandoned. This application June 26, 1975, Ser. No. 590,658
Claims priority, application Switzerland, Mar. 16, 1972, 3935/72; Feb. 16, 1973, 2327/73
Int. Cl.² C07C *43/27*
U.S. Cl. 260—612 R 3 Claims

1. 4-Benzyl-1-(3-Chloro-2-propenyl-1-oxy)-benzene.
2. 4-Cyclohexyl-1-(3-methyl-2-pentenyl-1-oxy)-benzene.
3. 4-benzyl-1-(2,3-dichloro-2-propenyl-1-oxy) benzene.

4,048,236

PROCESS FOR PREPARING o-ALKOXY-p-ALLYLPHENOLS

Shigeki Nagai; Fumio Iwata, and Kenzi Kubo, all of Ube, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Filed Feb. 17, 1976, Ser. No. 658,452
Claims priority, application Japan, Mar. 7, 1975, 50-27004; Mar. 7, 1975, 50-27005; Mar. 7, 1975, 50-27006
Int. Cl.² C07C *41/00*
U.S. Cl. 260—613 D 14 Claims

1. In a process for preparing an o-alkoxy-p-allylphenol in which the alkoxy is methoxy or ethoxy comprising contacting an o-alkoxyphenol in which the alkoxy is as defined above, with an allyl halide in the presence of an aqueous solution of an alkali metal hydroxide, the improvement which comprises employing a copper-containing compound and a nitrogen-containing compound as a catalyst, said copper-containing compound being selected from the group consisting of copper (I) chloride, copper (II) chloride, copper (I) bromide, copper (II) bromide, copper (II) sulfate, copper phosphate, copper acetate and copper oxide, the amount of the copper contained in said copper-containing compound being from 0.01 to 0.2 gram atom per one mole of the o-alkoxyphenol, and the said nitrogen-containing compound being selected from the group consisting of ammonia, ammonium chloride, ammonium phosphate, hydroxylamine hydrochloride, allylamine, an alkylamine having from 1 to 4 carbon atoms, an alkoxyalkylamine having 2 to 4 carbon atoms, an ethylenediamine, a carboxylic acid amide having 1 to 4 carbon atoms, a hydrazine having 0 to 4 carbon atoms and an amino acid, a temperature of from about 0° to about 50° C. being employed when the said nitrogen-containing compound is ammonia and a temperature of from about 0° to about 60° C. being employed when the said nitrogen-containing compound is other than ammonia.

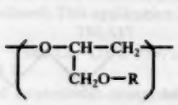
4,048,237

PROCESS FOR THE DEALKYLATION OF T-BUTYL AND T-AMYL ETHERS ON POLYMERIC BACKBONES

David L. Wolfe, and Arthur R. Sexton, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 415,458, Nov. 12, 1973, abandoned. This application June 23, 1975, Ser. No. 589,643
Int. Cl.² C07C *41/00*
U.S. Cl. 260—615 B 12 Claims

1. In a process for removing at least one —R where —R is tertiary butyl or tertiary amyl from a polymer comprising one or more units represented by the formula



(I)

by contacting at above about 90° C the polymer, which is in the liquid phase, with a sulfonic acid, the improvement comprising contacting the polymer with the sulfonic acid under essentially anhydrous conditions of less than about 7 percent water based on the weight of the polymer.

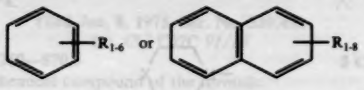
4,048,238

PROMOTED LIQUID PHASE OXIDATION OF ALKYL AROMATIC COMPOUNDS

Lloyd E. Gardner; Darryl R. Fahey, and John E. Mahan, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 7, 1975, Ser. No. 620,464
Int. Cl.² C07C *27/12, 29/00*
U.S. Cl. 260—618 R 10 Claims

1. A process for oxygenating an alkyl-substituted aromatic compound of the formula



wherein each R is selected from branched or unbranched alkyl groups having from one to about 6 carbon atoms, at least one R being an alkyl group free of quaternary carbon atoms, comprising a liquid phase and elevated temperature contacting of said compound with molecular O_2 in the presence of an alkanoic acid having from 1 to about 6 carbon atoms per molecule, an at least partially soluble Te or Se compound, an inorganic bromine compound, and a compound selected from inorganic nitrates and compounds convertible to inorganic nitrates at conditions of the present process said compounds selected from the group consisting of alkali metal nitrates, nitric acids, and oxides of nitrogen.

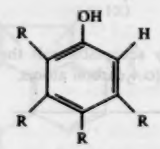
4,048,239

PROCESS FOR THE ORTHO ALKYLATION OF PHENOLS USING ALDEHYDES AND HYDROGEN IN THE PRESENCE OF A COPPER-CHROMIUM CATALYST

William Edward Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Apr. 13, 1976, Ser. No. 676,501
Int. Cl.² C07C *39/06, 37/12*
U.S. Cl. 260—624 C 7 Claims

1. A process for the selective ortho-alkylation of a phenolic compound of the general formula:



wherein each R is a monovalent substitutent selected from the group consisting of hydrogen, alkyl of 1 to 12 carbon atoms, aryl of 6 to 12 carbon atoms and alkaryl of 7 to 12 carbon atoms, the process comprising reacting at a temperature of from about 185° to about 400° C in the presence of a copper-chromium oxide catalyst said phenolic compound with hydrogen and an aldehyde represented by the formula

wherein R′ is hydrogen or an alkyl or alkenyl radical of up to about 12 carbon atoms, straight or branched chain, with said copper-chromium oxide catalyst being chosen from the group

consisting of crystalline copper chromites, amorphous mixed oxides of copper and chromium, and mixtures thereof.

4,048,240

METHOD OF OXIDIZING OR BLEACHING A CONTAMINANT IN A NON-AQUEOUS FLUID

Robert Frederick Connelly, Akasaka P.O. Box 10, Tokyo 107-91, Japan

Filed Oct. 19, 1976, Ser. No. 733,877
Claims priority, application Japan, Oct. 22, 1975, 50-126445
Int. Cl.² C07C *9/00, 19/00*
U.S. Cl. 260—652 P **6 Claims**

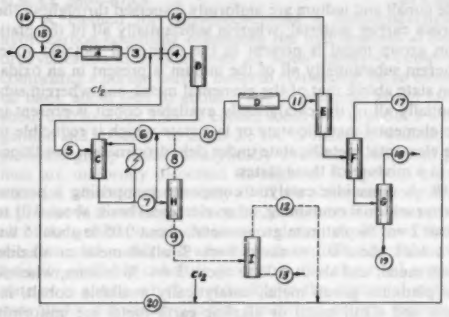
1. A method for oxidizing or bleaching a contaminant in a non-aqueous fluid which comprises forming nitrogen trichloride in situ by the reaction of a chlorine source and a nitrogen source in said fluid, and adsorbing said contaminant and said nitrogen trichloride on a solid adsorbent, and recovering said fluid substantially free of acid contaminant.

4,048,241

PROCESS FOR PREPARING 1,1,1-TRICHLOROETHANE

Theodore S. Boozalis; Darryl E. Cragar; John B. Ivy; Gordon G. Willis, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 462,701, April 22, 1974, abandoned. This application Mar. 31, 1965, Ser. No. 563,940
Int. Cl.² C07C *19/00*
U.S. Cl. 260—658 R **4 Claims**



1. A method for preparing 1,1,1-trichloroethane which comprises:

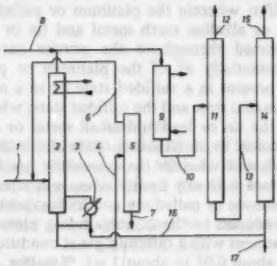
1. reacting ethylene, recycle ethylene from a later step in the process and hydrogen chloride, said hydrogen chloride being obtained from another step in the process, together in a liquid boiling reaction medium in the presence of a Fridel-Crafts aluminum chloride ($AlCl_3$) catalyst thereby to produce predominantly ethyl chloride;
2. reacting in the gas phase in a thermal reactor the so-produced ethyl chloride, recycle ethyl chloride from a later step and recycle 1,1-dichloroethane stream from another step in the process with chlorine at a temperature of from 400° to 550° C;
3. subjecting the so-produced reaction mixture from the thermal chlorination Step (2) to a hydrochlorination reaction in a liquid reaction medium in the presence of a Friedel-Crafts ferric chloride ($FeCl_3$) catalyst to convert vinylidene chloride in the said so-produced thermal chlorination reaction mixture to 1,1,1-trichloroethane and vinyl chloride in said so-produced thermal chlorination reaction mixture to 1,1-dichloroethane;
4. separating the hydrochlorination reaction mixture from Step (3) by distillation to recover a) 1,1,1-trichloroethane, as product, b) a lights fraction predominantly comprised of ethylene, ethyl chloride, and hydrogen chloride for recycling to Step (1), and c) a recycle fraction boiling between about 37° and about 60° C at atmospheric pressure which is principally 1,1-dichloroethane for recycle to Step (2).

4,048,242

PROCESS FOR THE PRODUCTION OF CYCLOPENTENE FROM DICYCLOPENTADIENE

Hubert Lauer, Straberg; Norbert Schenk, and Wulf Schwerdtel, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 8, 1975, Ser. No. 575,661
Claims priority, application Germany, May 24, 1974, 2425289
Int. Cl.² C07C *5/06, 5/16*
U.S. Cl. 260—666 A **17 Claims**



1. In a process for the production of cyclopentene from dicyclopentadiene which comprises splitting dicyclopentadiene under heat to form cyclopentadiene; partially hydrogenating the cyclopentadiene to form a crude cyclopentene containing an impurities fraction boiling at a higher boiling point than cyclopentene and containing cyclopentane; purifying the crude cyclopentene by distillation in which said impurities fraction is separated from the crude cyclopentene; the improvement which comprises recycling at least part of the separated impurities fraction as the impurities fraction is produced in said distillation to the dicyclopentadiene splitting stage, said separated impurities fraction comprising predominantly cyclopentane.

4,048,243

METHOD FOR THE PRODUCTION OF ETHYLBENZENE

Gerhard Ruckelshauss, Dorsten, Germany, assignor to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Jan. 6, 1976, Ser. No. 646,944
Claims priority, application Germany, Mar. 18, 1975, 2511674
Int. Cl.² C07C *15/02*
U.S. Cl. 260—668 D **10 Claims**

1. In the method for the production of ethylbenzene by catalytic dehydrogenation of cycloolefins having 8 carbon atoms and 2 double bonds in the presence of aromatization catalysts, the improvement comprising: said cycloolefins having a 6 carbon atom ring with at least one double bond, said dehydrogenation is carried out at a temperature of about 20° to 150° C and under a pressure of about 0.8 to 2 atmospheres, and said aromatization catalysts consisting essentially of about 5 to 25 percent by weight of an alkali metal and about 75 to 95 percent by weight aluminum oxide support.

4,048,244

DEHYDROGENATION METHOD USING SULFIDED NONACIDIC MULTIMETALLIC CATALYST

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 535,078, Dec. 20, 1974, Pat. No. 3,980,726, which is a continuation-in-part of Ser. No. 365,877, June 1, 1973, Pat. No. 3,856,870, which is a continuation-in-part of Ser. No. 27,457, April 10, 1970, abandoned. This application Sept. 10, 1976, Ser. No. 722,320

Int. Cl.[2] C07C 5/18

U.S. Cl. 260—668 D 17 Claims

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting the hydrocarbon at dehydrogenation conditions with a sulfided nonacidic catalytic composite comprising a porous carrier material consisting essentially of, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % iridium, about 0.1 to about 5 wt. % alkali metal or alkaline earth metal, about 0.01 to about 5 wt. % tin or lead, and about 0.01 to about 1 wt. % sulfur; wherein the platinum or palladium, iridium, alkali metal or alkaline earth metal and tin or lead are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and iridium are present in a sulfided state or in a mixture of the elemental metallic state and the sulfided state; wherein substantially all of the tin or lead and alkali metal or alkaline earth metal are present in an oxidation state above that of the elemental metal; and wherein the composite has been sulfided, prior to contact with any hydrocarbon and after substantially all of the platinum or palladium and iridium contained therein have been reduced to the corresponding elemental metallic state, by treatment with a sulfiding gas at conditions selected to incorporate about 0.01 to about 1 wt. % sulfur.

4,048,245

DEHYDROGENATION METHOD AND NONACIDIC MULTIMETALLIC CATALYTIC COMPOSITE FOR USE THEREIN

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application May 24, 1976, Ser. No. 689,317

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.[2] C07C 5/18; B01J 27/06

U.S. Cl. 260—668 D 34 Claims

1. A method for dehydrogenating a hydrocarbon comprising contacting the hydrocarbon, at dehydrogenation conditions, with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, and about 0.01 to about 5 wt. % tin; wherein the platinum group metal, catalytically available cobalt and tin are uniformly dispersed throughout the porous carrier material; wherein the average crystallite size of the tin and catalytically available cobalt is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the element metallic state or in a state which is reducible to the elemental metallic state under dehydrogenation conditions or in a mixture of these states.

19. A nonacidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.1 to about 5 wt. % alkali metal or alkaline earth metal, and about 0.01 to about 5 wt. % tin; wherein the platinum group metal, catalytically available cobalt, tin and alkali metal or alkaline earth metal are uniformly dispersed througout the porous carrier material; wherein the average crystalite size of the tin and catalytically available cobalt is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrogenation conditions or in a mixture of these states; and wherein substantially all of the tin and alkali metal or alkaline earth metal are present in an oxidation state above that of the elemental metal.

4,048,246

DEHYDROGENATION METHOD AND NONACIDIC MULTIMETALLIC CATALYTIC COMPOSITE FOR USE THEREIN

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 574,222, May 5, 1975, Pat. No. 3,959,121. This application May 24, 1976, Ser. No. 689,314

The portion of the term of this patent subsequent to June 25, 1993, has been disclaimed.

Int. Cl.[2] C07C 5/18; B01J 27/06

U.S. Cl. 260—668 D 35 Claims

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting the hydrocarbon, at dehydrogenation conditions, with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, and about 0.01 to about 5 wt. % indium; wherein the platinum group metal, catalytically available cobalt and indium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the indium is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrogenation conditions or in a mixture of these states.

19. A nonacidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, about 0.1 to about 5 wt. % alkali metal or alkaline earth metal, and about 0.01 to about 5 wt. % indium; wherein the platinum group metal, catalytically available cobalt, indium and alkali metal or alkaline earth metal are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrogenation conditions or in a mixture of these states; and wherein substantially all of the indium and alkali metal or alkaline earth metal are present in an oxidation state above that of the elemental metal.

4,048,247

PROCESS FOR THE CONVERSION OF AROMATIC HYDROCARBONS

Ji-Yong Ryu, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 644,783

Int. Cl.[2] C07C 3/06

U.S. Cl. 260—671 P 6 Claims

1. A process for the alkylation of an aromatic hydrocarbon which comprises contacting the aromatic hydrocarbon with an alkylating agent at aromatic alkylation conditions in the presence of a catalyst system consisting essentially of titanium tetrachloride on an activated Group III-A metal oxide having surface hydroxyl groups, said catalyst system having been prepared by passing $TiCl_4$ vapor with an inert gas over said metal oxide at a temperature of 20° to 400° C. for 1 to 10 hours and thereafter thermally treating the resultant $TiCl_4$-contain-

ing oxide in an inert atmosphere at a temperature of from about 135° to about 550° C.

4,048,248

PROCESS AND CATALYST FOR THE CONVERSION OF AROMATIC HYDROCARBONS

Ji-Yong Ryu, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 644,786
Int. Cl.² C07C *3/56*
U.S. Cl. 260—671 P **12 Claims**

1. A process for the alkylation of an aromatic hydrocarbon comprising contacting the aromatic hydrocarbon with an alkylating agent at aromatic hydrocarbon alkylation conditions in the presence of a catalyst consisting essentially of titanium tetrafluoride composited with a support which contains surface hydroxyl groups, and recovering an alkylated aromatic hydrocarbon as a product of the process.

4,048,249

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 593,086, July 3, 1975, Pat. No. 3,972,806. This application July 22, 1976, Ser. No. 707,730
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² C07C *5/22*
U.S. Cl. 260—673.5 **27 Claims**

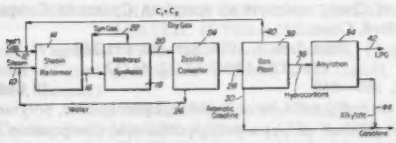
1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comrising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % gallium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt and gallium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the gallium is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,048,250

CONVERSION OF NATURAL GAS TO GASOLINE AND LPG

William E. Garwood, Haddonfield; Solomon M. Jacob; James C. Kuo, both of Cherry Hill, all of N.J., and John J. Wise, Media, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,168
Int. Cl.² C07C *3/52, 3/54*
U.S. Cl. 260—683.43 **10 Claims**



1. A process comprising:

reforming natural gas with steam to a synthesis gas product comprising hydrogen and carbon monoxide in ratio of about 1 to 5 to 1;

converting said synthesis gas product to a product comprising water, C_4^- light hydrocarbon gas and C_5^+ gasoline boiling range hydrocarbons containing monocyclic aromatics utilizing at least one catalyst comprising a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least 12 and a constraint index of 1 to 12;

separating the hydrocarbon portion of said conversion product into water, C_4^- hydrocarbon gas and C_5^+ gasoline;

separating said C_4^- gas into C_2^- tail gas, and on alkylation feed fraction comprising saturated and unsaturated C_3 and C_4 hydrocarbons;

recycling said tail gas to said steam reforming;

reacting said alkylation feed fraction in contact with an acid catalyst to gasoline boiling range aliphatic products comprising C_7 and C_8 alkylate; and

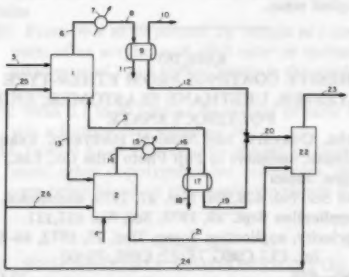
admixing said alkylate gasoline and said aromatic gasoline.

4,048,251

AUTOREFRIGERATED ISOMERIZATION PROCESS

Robert P. Cahn, Millburn, and Michael Siskin, Maplewood, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 2, 1976, Ser. No. 646,285
Int. Cl.² C07C *5/28*
U.S. Cl. 260—683.68 **26 Claims**



1. In an isomerization process which comprises reacting a hydrocarbon feed stock which comprises a saturated acyclic hydrocarbon having at least four carbon atoms, a saturated alicyclic hydrocarbon having at least six carbon atoms or mixtures thereof with hydrogen in a reaction zone comprising at least one reactor having therein at least one temperature zone and with a catalyst comprising a metal halide selected from the group consisting of the bromides and the chlorides of aluminum and gallium and the chlorides, bromides and fluorides of niobium, tantalum, molybdenum or tungsten and including in said isomerization zone at least an equal molar amount, based on the metal halide, of a hydrogen halide selected from the group consisting of hydrogen fluoride, hydrogen chloride and hydrogen bromide, at least a portion of said metal halide being dissolved in said hydrogen halide, said reaction zone being maintained at isomerization conditions which include at least a portion of the catalyst and hydrocarbon feed stock being in the liquid phase, thereby forming a reaction product of enhanced octane, the improvement which comprises controlling the temperature in said at least one temperature zone by vaporizing at least a portion of said hydrogen halide.

4,048,252

COATING COMPOSITIONS AND PROCESS THEREFOR

Klaus Behmel, Graz, Austria, assignor to Vianova-Kunstharz, A.G., Vienna, Austria

Continuation-in-part of Ser. No. 298,388, Oct. 17, 1972, Pat. No. 3,882,188. This application May 5, 1975, Ser. No. 574,447
Claims priority, application Austria, Oct. 29, 1971, 9369/71; Mar. 22, 1972, 2430/72; Mar. 10, 1972, 1995/72
Int. Cl.[2] C08G 63/06; C08L 77/00
U.S. Cl. 260—850 34 Claims

1. Process for producing thermosetting coating compositions from saturated polyesters containing hydroxy groups and aminoplast resins, characterized in that

A. n mols of one or more compounds having two free or latent hydroxy groups are reacted with

B. $n + 1$ mols of a dicarboxylic acid which will not form an anhydride, to form a polyester AB carrying terminal carboxy groups,

C. thereafter each mol of polyester AB is reacted with an amine alcohol of the general formula

$$HO - (CX_2)_n - NH_2$$

n being 2 or 3 and X is equal or different and stands for hydrogen, or an alkyl, aryl or hydroxy alkyl radical, the amount of AB to amine being equal to $(e_s - e_p)$ M_A wherein M_A is the molecular weight of the amine alcohol; e_s equals the number of carboxy equivalents in the polyester; and e_p equals the number of hydroxy equivalents in the polyester, and not exceeding 2 mols amine alcohol per mol polyester AB, to provide a polyester containing terminal oxazoline groups,

D. reacting ABC with an aldehyde in an amount sufficient to introduce sufficient hydroxyl groups at the carbon atoms alpha to the oxazoline group of ABC in order that ABC will undergo reaction with an aminoplast resin, and

E. combining ABCD with 10 - 60 percent by weight of an aminoplast resin.

4,048,253

ADHESIVE COATINGS FROM ETHER-TYPE POLYESTER, URETHANE ELASTOMER, AND POLYISOCYANATE

Seiichi Ooba, Odawara, and Shinichi Hirayama, Fukuyama, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Division of Ser. No. 428,998, Dec. 27, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,131
Claims priority, application Japan, Dec. 27, 1972, 48-2208
Int. Cl.[2] C08G 18/42; C08L 75/00
U.S. Cl. 260—858 10 Claims

1. An adhesive composition consisting essentially of an ether group containing polyester obtained by the heat treatment of a polyethylene terephthalate with at least one glycol having at least 3 carbon atoms to substitute the ethylene glycol components in the polyethylene terephthalate by said glycol having at least 3 carbon atoms, wherein 30 to 100% of the ethylene glycol components in the polyethylene terephthalate are substituted by said glycol having 3 or more carbon atoms

a linear thermoplastic high molecular weight urethane elastomer; and

a polyisocyanate which differs from said elastomer.

4,048,254

BLEND OF THERMOPLASTIC POLYMERS WITH BLOCK RADIAL BUTADIENE-STYRENE POLYMERS

Edward Lawrence Hillier; Glen Henry Graham, and Warren Evan Eichelberger, all of Ashland, Ohio, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 26, 1975, Ser. No. 607,978
Int. Cl.[2] C08L 27/00, 51/00
U.S. Cl. 260—859 R 22 Claims

1. An unvulcanized radial block copolymer mixture having a high degree of clarity and resealability consisting essentially of (a) from about 10 - 90% by weight of a butadiene-styrene radial block copolymer having a butadiene content in the range of about 85 - 60% by weight and a styrene content in the range of about 5 - 40% by weight, (b) from about 90 - 10% by weight of a butadiene-styrene radial block copolymer having a different butadiene-styrene content in the range of about 85 - 60% by weight and a styrene content in the range of about 15 - 40% by weight and (c) about 5 - 75% by weight of said radial block copolymer mixture of a clear polymeric material selected from the group consisting of polyether and polyester urethane polymers and mixtures of said clear polymeric material, both said radial block copolymers having an average molecular weight of at least 150,000 as measured by inherent viscosity in toluene, wherein said polyether urethane polymers are the reaction products of polyether glycols and aromatic diisocyanates and said polyester urethanes are the reaction products of linear hydroxyl terminated aliphatic polyesters, an aromatic diisocyanate and an aliphatic diol.

4,048,255

BLEND OF THERMOELASTIC POLYMERS WITH BLOCK RADIAL POLYMERS USED AS PHARMACEUTICAL SEALING AND RESEALING MATERIALS

Edward Lawrence Hillier; Glen Henry Graham, and Warren Evan Eichelberger, all of Ashland, Ohio, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 26, 1975, Ser. No. 607,979
Int. Cl.[2] C08L 27/00, 51/00
U.S. Cl. 260—859 R 11 Claims

1. A radial block copolymer mixture having a high degree of resealability and noncoring properties consisting essentially of (a) from about 10 - 90% by weight of a butadiene-styrene radial block copolymer having a butadiene content in the range of about 85 - 60% by weight and a styrene content in the range of about 15 - 40% by weight, (b) from about 90 - 10% by weight of a butadiene-styrene radial block copolymer having a differing butadiene content in the range of about 85 - 60% by weight and a styrene content in the range of about 15 - 40% by weight and (c) about 3 - 75% by weight of said block copolymer mixture of chlorinated polyethylene, which results in a nonclear composition, both said radial block copolymers having an average molecular weight of at least 150,000 as measured by inherent viscosity in toluene.

4,048,256

NORMALLY-SOLID, BIOABSORBABLE, HYDROLYZABLE, POLYMERIC REACTION PRODUCT

Donald James Casey, Ridgefield, and Martin Epstein, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed June 1, 1976, Ser. No. 691,749
Int. Cl.[2] C08G 63/12, 63/52
U.S. Cl. 260—860 13 Claims

1. A normally-solid, bioabsorbable, hydrolyzable, polymeric reaction product of (A) a polyglycolic acid composition and (B) a polyester of diglycolic acid and an unhindered glycol; wherein the amount of (B) used is between about 2% and 50%, by weight, based on the total weight of (A) and (B); wherein (A), before reaction with (B), has a molecular weight of at least 30,000 and (B), before reaction with (A), has a molecular weight sufficiently high so as to provide a polymeric material possessing self-supporting film-forming properties.

4,048,257

PIGMENTABLE LOW SHRINK THERMOSETTING POLYESTERS

Donald R. Stevenson, Dover, Ohio, assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 520,455, Nov. 4, 1974, abandoned, and a continuation-in-part of Ser. No. 516,446, Oct. 21, 1974, abandoned, and a continuation-in-part of Ser. No. 514,372, Oct. 15, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,757

Int. Cl.[2] C08L 67/06

U.S. Cl. 260—862 10 Claims

1. A molded part produced from a pigmented low-shrink, thermosetting, unsaturated polyester resin molding composition curable to form a low-profile molded structure having a uniformly pigmented surface, the improvement comprising:

said molding resin composition being a mixture comprising by weight at least 25% of a thermosetting ethylenically unsaturated polyester polymer, about 5% to 25% of lightly cross-linked preformed polymer particles, and about 30% to 70% of an ethylenically unsaturated monomer copolymerizable with said thermosetting polyester polymer for forming a thermoset matrix binding said preformed polymer particles;

said lightly cross-linked, preformed polymer particles having an average particle size between about 15 and 100 microns and being a linear polymer selected from the group consisting of copolymerized ethylenic monomers, polyesters, polyurethanes, polyamines, epoxides, alkyd polyesters, polyethers, and polycarbonates, said linear polymer cross-linked with minor amounts of multifunctional monomer providing cross-linking sites in the preformed polymer particles, said preformed polymer particles having a cross-linking density of between about 0.005 to 2 equivalent cross-linking sites per kilogram of said preformed polymer.

4,048,258

METHOD FOR PREPARING MOISTURE CURABLE POLYMERS CONTAINING RANDOMLY DISTRIBUTED SITES OF CONJUGATED OLEFINIC UNSATURATION

Francis P. Baldwin, Summit; James A. Rae, Cranford, and Gary Ver Strate, Matawan, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 507,227, March 18, 1974, abandoned. This application Apr. 23, 1976, Ser. No. 679,809

Int. Cl.[2] C08F 255/08, 255/10, 279/02

U.S. Cl. 260—879 29 Claims

1. A method for preparing an elastomeric polymer, curable by addition of a catalytic amount of water which comprises reacting a polymer containing randomly distributed sites of conjugated olefinic unsaturation, under anhydrous conditions, with up to 1 mol of a cyclic unsaturated anhydride per mol of conjugated units present in the polymer, then blending the reaction product with a polyvalent metal compound wherein the polyvalent metal compound is an oxide, hydroxide or alkoxide.

4,048,259

ANAEROBICALLY COMPOSITIONS CONTAINING ACRYLIC ESTER-ACIDS

Bernd Wegemund, Haan, and Joachim Galinke, Langenfeld, both of Germany, assignors to Henkel & Cie GmbH, Dusseldorf, Germany

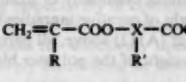
Filed July 2, 1976, Ser. No. 702,229

Claims priority, application Germany, July 4, 1975, 2529891

Int. Cl.[2] C08F 4/32, 20/10, 120/68

U.S. Cl. 260—881 14 Claims

1. An anaerobically setting adhesive and sealing composition consisting essentially of a polymerizable acrylic ester of spreadable viscosity, an organic aerobically inactive, anaerobically active peroxide polymerization initiator therefor, and an effective amount as latent agent improving the adhesiveness of said composition for metals when anaerobically set, in the range of 3% to 25% by weight, of an acrylic ester-acid of the formula:



wherein R represents a substituent selected from the group consisting of —H and —CH_3, R′ represents a substituent selected from the group consisting of H, halogen, —COOH, —CN, and loweralkyl, and X represents a divalent C_{1-6} hydrocarbon group.

4,048,260

THERMOPLASTIC COMPOSITIONS WITH IMPROVED PROCESSING PROPERTIES

Franz Haaf, Bad Durkheim; Guenter Hatzmann, St. Ilgen; Karl Herrle, Ludwigshafen, and Petr Simak, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 6, 1976, Ser. No. 702,974

Claims priority, application Germany, July 12, 1975, 2531197

Int. Cl.[2] C08L 27/06

U.S. Cl. 260—884 9 Claims

1. A thermoplastic composition containing a mixture of a vinyl chloride polymer and an acrylic ester copolymer or methacrylic ester copolymer, which mixture has been manufactured by polymerization of

A. from 99.9 to 80 parts by weight of vinyl chloride or of a mixture of vinyl chloride with up to 30 percent by weight of one or more other monomers copolymerizable with vinyl chloride, in aqueous dispersion, in the presence of

B. from 0.1 to 20 parts by weight of a copolymer of an acrylic acid ester or a methacrylic acid ester which contains

B1. From 99.9 to 60 percent by weight of copolymerized units of an acrylic acid alkyl ester or methacrylic acid alkyl ester of 2 to 6 carbon atoms in the alcohol component,

B2. from 0.1 to 30 percent by weight of units which contain a lactone ring structure and

B3. from 0 to 39.9 percent by weight of units of one or more other copolymerizable monomers, the percentages being based on the above copolymer B.

4,048,261

VULCANIZABLE COMPOSITIONS OF A HALOGEN-CONTAINING POLYMER AND A DIENE-NITRILE RUBBER HAVING ACTIVE HALOGEN CURE SITES

Philip Hubert Starmer, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 10, 1975, Ser. No. 630,452

Int. Cl.[2] C08L 23/28, 47/00

U.S. Cl. 260—888 11 Claims

1. A vulcanizable composition comprising (A) a polymer blend of (1) from about 1 part to about 99 parts by weight of a diene/nitrile rubber having a halogen content of from about 0.2 percent to about 5 percent by weight based on the polymer and comprised of interpolymerized units of from 50 percent to about 98 percent by weight of a non-halogen containing conjugated diene monomer having from 4 to about 10 carbon atoms, from about 1 percent to about 49 percent by weight of a non-halogen containing monoolefinically unsaturated nitrile monomer having 3 to about 6 carbon atoms, and from about 0.5 percent to about 20 percent by weight of a halogen-containing monomer have a Q value of from about 0.1 to about 6 and selected from the group consisting of halogen-bearing vinylidene hydrocarbons, halogen-containing acrylates, and halogen-containing vinyl ketones, and (2) from about 1 part to about 99 parts by weight of a halogen-containing polymer

selected from the group consisting of halogen-containing acrylate rubbers, halogen-containing diene rubbers, epihalohydrin polymers, and polyfluorocarbons, and (B) a cure system for the polymer blend consisting essentially of from about 0.1 part to about 7 parts by weight of curative ingredients for the halogen-containing polymer of (A) (2) above, all parts by weight based upon 100 parts by weight of the polymer blend.

4,048,262

POLYDODECENAMERS AS REINFORCING RESINS FOR ELASTOMERS

Horst Haag; Karl-Heinz Nordsiek; Roland Streck, all of Marl, and Dieter Zerpner, Oer-Erkenschwick, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Dec. 10, 1975, Ser. No. 639,364
Claims priority, application Germany, Jan. 2, 1975, 2500025
Int. Cl.[2] C08L 9/00, 23/00
U.S. Cl. 260—889 14 Claims

1. A method for improving the properties of elastomeric vulcanizates comprising compounding with 100 parts by weight of an elastomer prior to vulcanization 25–250 parts by weight of a polydodecenamer reinforcing resin having a reduced specific viscosity, measured in decahydronaphthalene at 135° C., of 0.5 – 6 dl./g., and a trans-vinylene content of more than 60%, obtained by polymerication of a mixture of
   a. 50–95% by weight of cyclododecene,
   b. 5–40% by weight of cyclododecadiene, and
   c. up to 10% by weight of 1,5,9-cyclododecatriene, in a solvent by a methathesis catalyst; and vulcanizing the compounded elastomer.

4,048,263

RUBBER MODIFIED FIRE RETARDANT POLYMER COMPOSITIONS

Yoon C. Lee, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 644,492
Int. Cl.[2] C08L 27/00, 47/00
U.S. Cl. 260—890 10 Claims

1. A composition of matter comprising:
A. from 48 to 94 percent by weight based on the total weight of the molding composition of a polyblend of:
   a. a matrix polymer of
      1. from 55 to 85 percent by weight of a styrene monomer;
      2. from 5 to 25 percent by weight of a maleic anhydride monomer; and
      3. from 10 to 20 percent by weight of a brominated monomer selected from the group consisting of bromophenyl acrylates, bromophenyl methacrylates, bromoneopentyl acrylate and bromoneopentyl methacrylates with the proviso that the amount of bromine in the polymer is at least 6 percent by weight and
   b. a rubber component wherein the amount of rubber in the polyblend is in the range of from 1 to 30 percent by weight based on the weight of the polyblend;
B. from 3 to 12 percent by weight based on the total weight of the molding composition of a metal oxide;
C. from 3 to 25 percent by weight based on the total weight of the molding composition of a smoke suppressant which is selected from the group consisting of smoke suppressing hydrates, carbonates and borates, and
D. from 0 to 15 percent by weight of a brominated aromatic fire retardant additive.

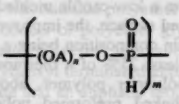
4,048,264

POLYMERIC PHOSPHORAMIDES

Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Continuation of Ser. No. 26,402, April 7, 1970, abandoned, which is a division of Ser. No. 596,798, Nov. 25, 1966, Pat. No. 3,524,908. This application Oct. 3, 1975, Ser. No. 619,516
Int. Cl.[2] C07F 9/24
U.S. Cl. 260—929 6 Claims

1. A polymeric phosphoramide compound selected from the group consisting of polymeric phosphoramides and hydrohalide salts thereof prepared by reacting
   1. a polymeric ester of the formula



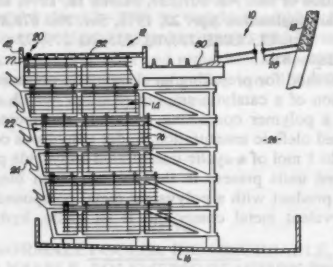
   where A is an alkylene radical,
   n is about 1 to 50 and
   m is about 2 to 40 and
   2. ammonia, an aliphatic or cycloaliphatic or arylamine having at least one primary or secondary amino group or a mixture of said amines, in the presence of an aliphatic polyhalide reactant and a tertiary amine to form the polymeric phosphoramides and in the presence of an aliphatic polyhalide reactant alone to form the hydrohalide salts thereof.

4,048,265

DEICEING APPARATUS FOR WATER COOLING TOWERS INCLUDING SLOTTED DISTRIBUTION BASIN AND SELECTIVELY ACTUATABLE VALVE MECHANISM

Homer E. Fordyce, Kansas City, Mo., and William C. Carter, Lenexa, Kans., assignors to The Marley Company, Mission, Kans.

Filed Mar. 1, 1976, Ser. No. 662,560
Int. Cl.[2] F28C 1/04
U.S. Cl. 261—111 11 Claims



1. A water cooling tower comprising:
a hot water distribution basin having a generally horizontal bottom wall;
fill structure beneath said distribution basin for dispersing hot water gravitating from the latter for enhancing the evaporative cooling of the hot water;
a cold water collection basin beneath said fill structure for collecting cooled water gravitating from the latter;
means for directing ambient derived air currents through said fill structure for cooling of the hot water gravitating therethrough; and
selectively actuatable deicing means for deicing the outer margin of said tower, including
horizontal, elongated slot means extending through the

bottom wall of the distribution basin at an area of said bottom wall generally parallel to and overlying the outer margin of said tower, said slot means being configured and arranged for downward delivery of sufficient quantities of hot water therethrough directly onto at least a portion of said outer margin of the tower to effect deiceing thereof under cold weather conditions;

elongated, shiftable cover means overlying said slot means in at least partial water flow-blocking disposition thereto; and

selectively actuatable means for shifting said cover means as desired from said flow-blocking disposition to a deiceing position permitting free flow delivery of hot water through said slot means, and for selective return of said cover means to said flow-blocking disposition when deiceing of the tower is complete.

4,048,266

AIR BUBBLING MAT FOR USE IN BATHTUBS FOR PRODUCING BUBBLING AND FULL-FOAM BATHS

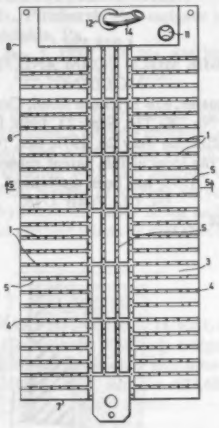
Ludwig G. Baumann, Ch 9527 Im Reckholder, Niederhelfenschwil, Switzerland (CH9527)

Filed July 21, 1975, Ser. No. 597,353

Claims priority, application Germany, Aug. 30, 1974, 2441686; Nov. 11, 1974, 2453291

Int. Cl.² B01F *3/04*

U.S. Cl. 261—122 **4 Claims**



1. An air bubbling mat for use in a bathtub which can be selectively utilized to produce either a bubbling bath or a full-foam bath, comprising a substantially flat, elongated mat having opposed upper and lower walls forming respectively the upper and lower surfaces, opposed end and side walls interconnecting said upper and lower walls about the periphery of said upper and lower walls defining a hollow mat body, means disposed in said mat body to define a manifold chamber, said manifold chamber having an inlet means which is adapted to be connected to a source of compressed air, partition means disposed between said upper and lower walls to define therewith a plurality of air distributing channels through which air is distributed when said mat is utilized to produce a bubbling bath, said upper wall having a plurality of grooves formed on the surface thereof, said grooves extending transversely of each of said air distributing channels, and said grooves having a plurality of apertures formed therein disposed in communication with the associated air distributing channel through which the air distributed to said distributing channels flows when used to make a bubbling bath, and a second partition means disposed between said upper and lower walls and defining with said side walls separate foaming air channels, said side walls having a series of openings formed therein communicating with said foaming air channels through which air is permitted to flow outwardly from said mat when said mat is utilized as a full-foam bath mat, said manifold having a plurality of outlets, said outlets being respectively in communication with each of said plurality of air distributing channels and said foaming air channels, and means for selectively opening and closing said outlets for selectively distributing air from said manifold to one or more of said air distributing channels or to said foaming air channel only.

4,048,267

AERATION SYSTEM WITH FOLDABLE LOW-LOSS DOWNCOMERS AND METHOD OF OPERATION THEREOF

James Donald Walker, and Leslie F. Kline, both of Aurora, Ill., assignors to Chicago Bridge & Iron Company, Chicago, Ill.

Continuation of Ser. No. 217,523, Jan. 13, 1972, abandoned. This application Mar. 21, 1974, Ser. No. 453,260

Int. Cl.² B01F *3/04*

U.S. Cl. 261—122 **8 Claims**

5. Air diffuser apparatus including a low-loss downcomer for delivering air from a supply fitting to a header carried at its foot for deep submergence in an aeration tank, the downcomer being foldable at an intermediate level by virtue of hinge means rigidly associated with upper and lower sections of the downcomer and hinged together about an axis which passes in substantially nonintersecting relationship to the air flow space within the downcomer, the hinged parts, with their upper and lower sections, being substantially sealed to one another when the hinge means is closed and breaking open to the surrounding medium as the downcomer folds and the downcomer being readily manipulatable to bring the header to adjacency with the supply fitting;

spring means effective when the hinge mean is closed for holding it closed firmly to maintain a seal and proper alignment of the sections.

4,048,268

STABILIZATION METHOD

Nelson Henry Ludwig, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 551,194, Feb. 19, 1975, abandoned. This application Dec. 4, 1975, Ser. No. 637,697

Int. Cl.² B29C *17/14*

U.S. Cl. 264—15 **8 Claims**

1. The method of stabilizing the antibiotic tylosin for use in an animal feed premix and in animal feeds, which method comprises the steps of:

A. intimately blending a mixture comprising from about 1 to about 40 percent on a dry weight basis of the antibiotic, about 50 to about 98 percent on a dry weight basis of a finely ground diluent selected from the group consisting

of solvent-extracted soybean feed and alfalfa meal, with water, or intimately blending a mixture comprising from about 1 to about 20 percent on a dry weight basis of the antibiotic, about 50 to about 98 percent on a dry weight basis of a finely ground diluent selected from the group consisting of soybean mill run, milo flour, wheat middlings, and corn flour, with water, to form an intimate admixture;

B. blending the intimate admixture (A) with a physiologically-acceptable binder selected from the group consisting of hydrolyzed starch, gelatin, polyvinylpyrrolidone, soy protein, cellulose, bentonite, acacia powder, and lignin sulfonate, the binder amounting to from about 1 to about 10 percent of the weight of the components of step (A), to produce a wet but freeflowing particulate material;

C. extruding the blend of (B) under pressure through round perforations of from about 0.3 mm. to about 1.0 mm. in diameter, forming an extrudate of elongated strands having a length generally exceeding the cross-sectional dimension;

D. reducing the strands of extrudate (C) into particles of from about one to about five times their cross-sectional dimension in length; and

E. drying the particles from (D) at a temperature ranging from about room temperature to about 70° C. to a residual moisture content of from about 5 to about 12 percent.

4,048,269

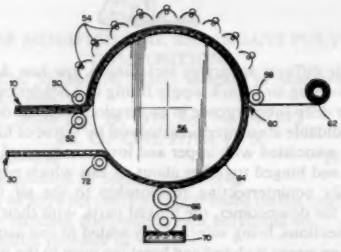
EMBOSSED SUEDE MATERIAL AND METHOD OF PREPARING SAME

Reuben Wisotzky, Lexington, and John C. Bolger, Chelmsford, both of Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Division of Ser. No. 458,644, April 8, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,588

Int. Cl.² B29D *27/00*

U.S. Cl. 264—25 **4 Claims**



1. A method of preparing a preferentially embossed suede-like sheet material, which method comprises:

a. providing an integral laminate sheet material, the sheet material comprising a paper sheet, a plasticized vinyl-chloride resin foam layer adjacent the paper sheet, a solid plasticized vinyl-chloride resin adjacent the foam layer and a woven fabric adjacent the other surface of the solid layer;

b. placing the laminate sheet material into contact with the surface of a heated rotating drum and partially about the surface of the drum, with the fabric portion of the laminate against the heated surface of the drum;

c. heating the external paper sheet material of the laminate with infrared-radiant heaters, while rotating the sheet laminate material on the surface of the rotating drum, to heat the laminate sheet material by the heat of the rotating drum and the infrared heaters to a temperature of from about 250° to 350° F;

d. stripping the paper sheet from the sheet material with a portion of the foam layer while heating the laminate to provide a suede-like sheet material comprising the woven fabric and the solid layer, with a hot plasticized vinyl-chloride resin foam surface layer on the rotating drum, the foam surface having a suede-like surface appearance and composed of tensile-ruptured foam cells; and

e. embossing a desired surface design onto the suede-like foam surface, while retaining the fabric of the suede-like sheet material against the surface of the rotating heated drum, by lightly contacting the hot suede-like surface of the sheet material with slightly more than contacting pressure by an embossing roll, the heated suede-like material passed between the surface of the embossing roll and the surface of the drum, the embossing roll having a temperature lower than the temperature of the hot suede surface to be embossed, certain surface areas of the embossing roll not being placed in contact with certain portions of the original suede-like surface of the sheet material during the embossing step, while the contacting portion of the embossing roll forms a smooth, continuous, nonsuede-like skin layer composed of the cellular vinyl-chloride resin in the contacting areas to provide an embossed suede-like material having peak and valley areas, the unembossed peak areas characterized by the original suede-like tensile-ruptured surface and original cellular foam density, and the embossed valley areas comprising a nonsuede-like surface skin layer thereon and a denser cellular foam thereunder than under the peak areas.

4,048,270

DISPOSABLE MOLD FORM AND METHOD OF MOLDING

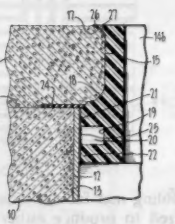
William J. Stegmeier, 878 Erickson Road, Concord, Calif. 94520

Division of Ser. No. 761,726, Sept. 23, 1968, Pat. No. 3,967,422. This application July 24, 1975, Ser. No. 598,700

The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.

Int. Cl.² E04B *1/16*

U.S. Cl. 264—34 **3 Claims**



1. In a method of forming a coping along the upper edges of the generally vertical walls of a swimming pool, the steps of providing an integral elongated form section of a foamed synthetic plastic material having a surface portion thereof configured in the finished shape to be imposed thereby upon such coping and having also an attachment portion facing in the same general direction as said configurated surface portion, equipping said upper edges of said generally vertical walls with a water-impervious finish layer, securing one side of a relatively non-stretchable double-faced pressure-sensitive tape strip to said attachment portion and securing the other side thereof to said water-impervious finish layer on said walls adjacent the upper edges thereof with said configurated surface portion of said form section projecting thereabove, spreading a moldable mass of concrete against said form section, and stripping said form section and said tape strip from attachment to said water-impervious finish layer after said concrete mass is cured, whereby a concrete coping is provided along said wall upper edges.

4,048,271

DRY PROCESS FOR FORMING POLYCARBONATE MEMBRANES

Robert E. Kesting, Irvine, Calif., assignor to Chemical Systems, Inc., Irvine, Calif.

Division of Ser. No. 293,943, Oct. 2, 1972, Pat. No. 3,945,926, which is a continuation-in-part of Ser. No. 190,415, Oct. 18, 1971, abandoned. This application Jan. 5, 1976, Ser. No. 646,735
Int. Cl.² B29D *27/04*
U.S. Cl. 264—41 17 Claims

1. The dry process for preparing high void volume, integral, microporous membranes consisting essentially of the steps of:
preparing a casting solution containing from about 3 to about 10 grams of polycarbonate homopolymers or copolymers having a molecular weight of between about 46,000 ([η] = 75) and 145,000 ([η] = 190) in about 100 ml of solution consisting essentially of from about 30 to about 90 ml of solvent for said polymer and from about 5 to about 50 grams of nonsolvent swelling agent for said polymer,
casting the solution upon a substrate, and
allowing the casting solution to evaporate to completion thereby forming an integral, high void volume, microporous membrane.

4,048,272

METHOD FOR PREPARING IMPROVED EXPANDED POLYSTYRENE SHEET

John P. Spicuzza, Jr., Pittsburgh, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Jan. 2, 1976, Ser. No. 646,293
Int. Cl.² B29D *27/00*
U.S. Cl. 264—45.3 11 Claims

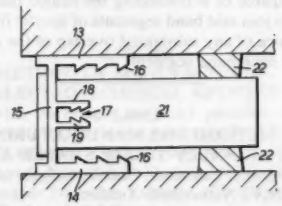
1. In a process for producing microcellular expanded styrene polymer sheet by extruding a mixture containing styrene polymer, a blowing agent and a nucleating system, the improvement comprising extruding with said mixture about 0.002 to 2%, based on the total weight of styrene polymer, of hydrophobic silica, said hydrophobic silica being uniformly distributed throughout said mixture whereby said sheet has improved flexability.

4,048,273

METHOD OF MAKING A STRUCTURAL ELEMENT

Alan Pryce-Jones, Cheltenham, England, assignor to Jeremy Bruce Holt, Cheltenham, England, a part interest

Filed Oct. 17, 1975, Ser. No. 623,650
Int. Cl.² B29D *27/00*
U.S. Cl. 264—46.5 3 Claims



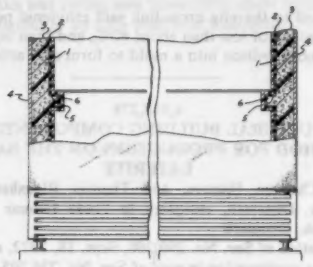
1. A method of making a structural element which includes:
a. providing a mould element,
b. providing a plurality of frame members including spaced parallel limbs the inner faces of which are provided with keying formations,
c. assembling the frame members to form a framework in engagement with the mould element so that the framework cooperates with the mould element to define the periphery of a mould cavity, and
d. injecting foamed plastics material into said mould cavity so as to form a structural element which comprises foamed plastics material surrounded by the framework and mechanically interlocked with the keying formations on the inner faces of the frame members.

4,048,274

PROCESS FOR REFRIGERATOR CONSTRUCTION

A. Russell Hoge, and Robert A. Myers, both of Wilbraham, Mass., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 594,927, July 10, 1975, abandoned, which is a division of Ser. No. 535,548, Dec. 23, 1974, abandoned. This application May 26, 1976, Ser. No. 690,115
Int. Cl.² B29D *27/04*
U.S. Cl. 264—46.5 10 Claims



1. In a process for preparing a refrigerator cabinet comprising an exterior surface, a sheet of ABS which forms the interior surface of the refrigerator, and a layer of a gas filled cellular insulation material which is interposed between the exterior surface and the ABS sheet, said process comprising (1) placing the member which forms the exterior surface and the ABS sheet in a spaced apart relationship; (2) introducing a foamable resin composition containing a halogenated apliphatic or cycloaliphatic hydrocarbon between the exterior surface and the ABS sheet; and (3) foaming the foamable resin composition to form a cellular insulation material wherein a major amount of the cells in the insulation material are filled with a halogenated aliphatic or cycloaliphatic hydrocarbon, the improvement which comprises using an ABS sheet which has bonded thereto a coextensive sheet of a rubber-modified high nitrile polymer wherein the rubber-modified high nitrile polymer is facing the exterior surface and is in laminated contact with the foam in the refrigerator cabinet wherein the rubber-modified high nitrile polymer contains from 45 to 85 percent by weight, based on the total polymer weight of a nitrile monomer unit and from 5 to 30 percent by weight of a synthetic or natural rubber component.

4,048,275

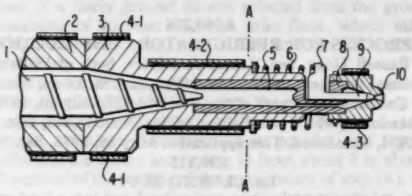
CROSS-LINKING AND FOAMING INJECTION MOLDING PROCESS FOR ETHYLENIC POLYMERS

Teruyoshi Usamoto, Higashi Osaka; Kenji Miyawaki, Ibaraki; Toshiaki Shiota, Takatsuki; Hideki Takeuchi, Toyonaka, and Yoshio Tadokoro, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 30, 1975, Ser. No. 627,409
Claims priority, application Japan, Oct. 30, 1974, 49-125916
Int. Cl.² B29D *27/00*; B29F *1/08*
U.S. Cl. 264—54 8 Claims

1. A process for injection molding a cross-linked foamed ethylenic polymer article, which comprises plasticizing a molding composition comprising an ethylenic polymer, a cross-linking agent, and a foaming agent without substantially decomposing the cross-linking agent and the foaming agent, transporting said plasticized composition to a holding chamber, holding and heating said molding composition tempera-

ture and time sufficient to decompose the cross-linking agent and the foaming agent in said holding chamber while maintaining sufficient pressure on said composition to prevent foaming



thereof and to thereby cross-link said ethylenic polymer to a gel percentage of less than about 40%, and then injecting said molding composition into a mold to form said article.

4,048,276

STRUCTURAL BUILDING COMPONENTS AND METHOD FOR PRODUCTION ON THE BASIS OF LATERITE

Torben Christen Hansen, and Thomas Ringsholt, both of Lyngby, Denmark, assignors to Frede Hilmar Drostholm, Vedbaek, Denmark

Continuation of Ser. No. 290,260, Sept. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 236,205, March 20, 1972, abandoned. This application Mar. 6, 1975, Ser. No. 556,015

Claims priority, application United Kingdom, Mar. 22, 1971, 7517/71

Int. Cl.[2] C04B *41/30*

U.S. Cl. 264—79 **25 Claims**

1. A method for production of high strength structural building components, comprising preparing a moldable mixture of lime, laterite and water, the laterite comprising laterite particles containing iron oxide and silicon and aluminum, in the form of oxides and/or silicates thereof, and containing at least 8 weight percent of aluminum calculated as Al_2O_3 and at least 4 weight percent of Fe_2O_3, and the silicon content of the laterite including from 10 to 50 percent of quartz sand based on the weight of the laterite, the laterite comprising from 55 to 93 weight percent, the line from 5 to 15 weight percent and the water from 10 to 20 weight percent of the moldable mixture, the moldable mixture having the consistency of a free flowing mass, forming the components by pressure molding the mixture in a mold to form components which are sufficiently coherent to withstand transport, handling and stacking without damage, the pressure applied to the mixture being sufficient to provide a density in said components of 2000 to 2200 kg/m^3, transporting the components to a curing station comprising an enclosure having a moisture saturated environment at atmospheric pressure and curing the pressure molded components at atmospheric pressure in said moisture saturated environment at a temperature between 70° C and 100° C, the curing being continued until the components attain a compressive strength of at least 140 kg/cm^2 and a lime (as CaO) content of less than one or two percent.

2. A method for production of structural building components, comprising preparing a moldable mixture of lime, laterite and water, the laterite comprising laterite particles containing iron oxide and silicon and aluminum, in the form of oxides and/or silicates thereof, forming the building components from said mixture by applying pressure to said mixture in an amount sufficient to provide a density in said components of 2000 to 2200 kg/m^3, the laterite comprising from 55 to 93 weight percent and the lime from 5 to 15 weight percent of the moldable mixture and the quantity of water being sufficient to yield pressure formed components which are sufficiently coherent and shape retaining to withstand transport, handling and stacking without damage, transporting the components to a curing station, and at said station curing the pressure formed components at atmospheric pressure in a moisture saturated environment and at a temperature of from 60° C to 100° C, the curing being continued until the components have a compressive strength of at least 140 kg/cm^2 and a lime (as CaO) content of less than one or two percent.

4,048,277

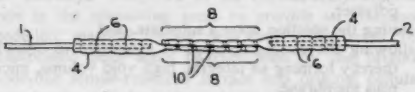
SPLICE FOR USE DURING THE THERMAL STABILIZATION OF A FLAT MULTIFILAMENT BAND OF AN ACRYLIC FIBROUS MATERIAL COMPRISING AT LEAST TWO SEGMENTS

Robert A. Breznak, Clifton, and James A. Parker, Somerville, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 641,066

Int. Cl.[2] D06M *3/36*

U.S. Cl. 264—83 **7 Claims**



1. In a process for the thermal stabilization of a substantially flat multifilament band of an acrylic fibrous material wherein the ends of at least two discrete band segments are joined and continuously are passed in a successive manner in the direction of their length through a heated thermal stabilization zone while maintaining the original fibrous configuration of the same substantially intact for a residue time sufficient to render said band black in appearance, and non-burning when subjected to an ordinary match flame; the improvement comprising joining the ends of at least two of said band segments by (1) surrounding an end of each band segment with a fabric which is capable of withstanding the heated thermal stabilization zone having a weave configuration through which heat of reaction is permitted to dissipate with a portion of said fabric extending beyond each enclosed end of said band segment to form a substantially flat fabric extension, (2) sewing said fabric to each band segment in the area were said band is enclosed by said fabric with a thread which is capable of withstanding the heated thermal stabilization zone while maintaining the enclosed portion of said band in a substantially flat configuration, (3) overlapping a pair of said substantially flat fabric extensions in the absence of any substantial overlap of the acrylic fibrous material of each band segment with each of said band segments extending in an opposite direction, and (4) sewing together said overlapped substantially flat fabric extensions with a thread which is capable of withstanding the heated thermal stabilization zone to join said band segments of acrylic fibrous material in the absence of any substantial overlap of the acrylic fibrous material of each band segment.

4,048,278

METHOD FOR MANUFACTURING DIMENSIONALLY-STABLE SHAPED ARTICLES

George D. Mosky, Lancaster, Canada, assignor to Intalite International N.V., Netherlands Antilles

Continuation-in-part of Ser. No. 470,648, May 16, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,457

Claims priority, application Canada, May 17, 1973, 171705; Japan, Oct. 30, 1973, 48-121283

Int. Cl.[2] B29D *3/02*

U.S. Cl. 264—135 **5 Claims**

1. A method for the manufacture of a dimensionally-stable shaped article for use as a ceiling coffer, comprising the steps of soaking asbestos paper sheets in a bath containing a mineral acid selected from the group consisting of sulfuric acid, hydrochloric acid and phosphoric acid, applying in a substantially pressureless manner at least one sheet of the soaked asbestos

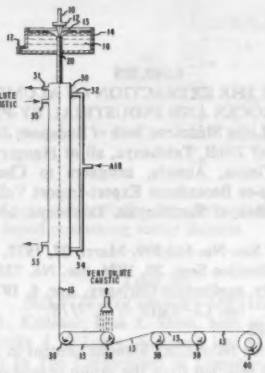
paper sheet as a layer to a mold and drying at normal room temperature, whereby to form a shrink-proof article without application of heat.

4,048,279

WASHING PROCESS FOR INORGANIC ACID CONTAINING POLYAMIDE FIBERS

Joseph Zimmerman, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 25, 1975, Ser. No. 590,373
Int. Cl.[2] D01F *6/00*; B08B *3/00*
U.S. Cl. 264—184 **3 Claims**



1. Process for the continuous high-speed production of neutral to very slightly basic polyamide yarn comprising in sequence

1. extrusion of an inorganic acid containing spin dope through a plurality of orifices,
2. coagulation of the yarn in an aqueous bath,
3. stripping of entrained liquid,
4. treating the yarn with a caustic solution having a concentration of 0.3 to 1.3%,
5. stripping the liquid from the yarn,
6. treating the yarn with a caustic solution having a concentration of 0.01 to 0.1%,
7. drying the yarn and
8. winding the yarn in a package.

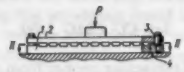
4,048,280

METHOD OF MANUFACTURING ELECTROTECHNICAL ARTICLES

Jury Gordeevich Borzyak, Armyansky pereulok, 1/3, kv. 76; Alexandr Ivanovich Borisenko, prospekt Pravdy 7, kv. 274; German Mikhailovich Tjufilin, Moskovsky prospekt, 192/4, kv. 46; Alexandr Ivanovich Rolik, ploschad Teveleva 2/2, kv. 58, and Alexandr Ivanovich Yakovlev, 601 mikroraion 23, kv. 54, all of Kharkov, U.S.S.R.

Filed Sept. 17, 1971, Ser. No. 181,413
Int. Cl.[2] B29C *15/00*; B29D *7/10*
U.S. Cl. 264—102 **4 Claims**

1. A method for the manufacture of electrotechnical articles, such as magnetic core members for electrical machines, from a magnetodielectric composition which comprises mixing together iron powder and a thermosetting resin containing a curing agent in vacuo to remove air inclusions and thermosetting reaction volatile products; batching the resulting composition; rolling the batched composition to obtain flat sheet blanks having a thickness greater than that of finished articles; molding and simultaneously pre-forming said sheets to obtain compacted blanks; and curing said blanks first under natural conditions and thereafter by step-wise heat treatment.

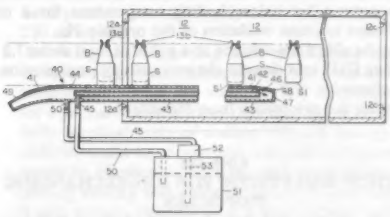


4,048,281

METHOD OF ASSEMBLING PLASTIC WRAP ON A GLASS CONTAINER

Marshall G. Brummett, Toledo; Russell W. Heckman, Perrysburg; George A. Nickey, and James E. Taylor, both of Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 17, 1976, Ser. No. 658,651
Int. Cl.[2] B29C *27/20*
U.S. Cl. 264—230 **7 Claims**



1. The method of making a container having an encircling plastic covering thereon comprising conveying containers in line in an upright position along a first path, moving heat shrinkable thermoplastic sleeves in line in an upright position along a second path that includes a portion in underlying axial registry with containers being conveyed along said first path, transferring the registered sleeves to overlie the respective containers while in axial registry in said first and second paths, moving the containers and sleeves thereon in said first path to and through a heating zone wherein the sleeves are sufficiently heated to completely shrink them snugly over the container exterior surface, holding the sleeves in said transferred position while moving the containers and sleeves to and through the heating zone by passing them over a sleeve supporting bar underlying said first path in engagement with the end of said sleeves until they are heated sufficiently to shrink said sleeves annularly and hold the sleeves in said position on the containers, and maintaining the surface of the supporting bar engaging said sleeves at a temperature below 200° F to avoid sticking of the plastic thereon.

4,048,282

SOLVENT EXTRACTION OF COPPER WITH DILUTION OF THE ORGANIC PHASE

William Hopkin, Bristol, England, assignor to Metallurgical Processes Limited, Nassau, Bahamas and I.S.C. Smelting Limited of London, London, England

Filed Aug. 5, 1975, Ser. No. 602,023

Claims priority, application United Kingdom, Aug. 23, 1974, 37096/74

Int. Cl.[2] C01G *3/00*

U.S. Cl. 423—24 4 Claims

1. In a method of extracting copper from an aqueous ammoniacal leach solution which is derived from the leaching of copper dross and which contains impurity cations, comprising contacting the leach solution with a copper-selective organic phase comprising a copper selective hydroxy-oxime organic extractant in an organic diluent to take copper into the organic phase to form a highly loaded copper organic phase, washing the highly loaded copper organic phase with a dilute acid and stripping the copper from the washed highly loaded copper organic phase into an aqueous phase, the improvement comprising reducing the concentration of copper in the copper-loaded organic phase by from 5% to 20% before the highly loaded copper organic phase is washed with the dilute acid.

4,048,283

REMOVAL OF HEAVY METALS FROM AQUEOUS SOLUTIONS

John Malcolm Lee, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 4, 1976, Ser. No. 693,048

Int. Cl.[2] C01G *37/14*

U.S. Cl. 423—92 12 Claims

1. A process for removing organic Pb compounds from an aqueous brine solution, the said process comprising,

providing an acidic aqueous brine solution containing organic Pb compounds,

adding to said solution chromate or dichromate ions in an amount sufficient to oxidize at least a substantial portion of said organic Pb compounds,

subjecting the solution to a temperature above ambient temperature but below boiling temperature for a time sufficient to cause oxidation of the organic Pb,

raising the pH of the solution to a pH of at least about 7.0 by adding OH^- ions thereto, thereby causing precipitation of Pb chromate, and

separating the precipitate from the solution.

4,048,284

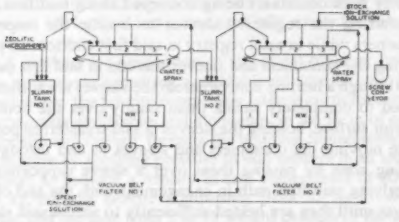
METHOD AND SYSTEM FOR ION-EXCHANGING PARTICLES

Norman H. Horton, and John L. Smith, both of Tallahassee, Fla., assignors to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Filed Mar. 8, 1976, Ser. No. 665,095

Int. Cl.[2] F01C *19/02;* B01J *8/00, 29/06*

U.S. Cl. 423—112 8 Claims



1. A method for ion-exchanging zeolitic particles of a size suitable for use in fluidized bed processes with an ion-exchange solution containing cations capable of replacing cations in the zeolitic particles which comprises carrying out the ion-exchange reaction in stages by continuously passing the zeolitic particles, in series, over a continuously moving horizontal vacuum belt filter where the particles are in the form of a thin porous cake, into an agitated vessel to form a slurry and then over another continuously moving horizontal vacuum belt filter where the zeolitic particles are again in the form of a thin porous cake, while continuously contacting the zeolitic particles during such passage countercurrently with ion-exchange liquid, and washing the ion-exchanged zeolitic particles with water only after discharge from the last belt filter inthe series.

4,048,285

PROCESS FOR THE EXTRACTION OF ALUMINA FROM MINERALS, ROCKS AND INDUSTRIAL BY-PRODUCTS

Karoly Szepesi; Lajos Mészáros, both of Budapest; János Majer, Godollo; József Zöldi, Tatabanya, all of Hungary, and Karl Entzmann, Vienna, Austria, assignors to Chemokomplex Vegyipari Gep-es Berendezes Export-Import Vallalat, Budapest and Tatabanyai Szenbanyak, Tatabanya, both of, Hungary

Continuation of Ser. No. 562,399, March 27, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,283

Claims priority, application Germany, Apr. 4, 1974, 2416407

Int. Cl.[2] C01F *7/12, 7/18*

U.S. Cl. 423—132 11 Claims

1. A process for recovering alumina present in an alumina-bearing material selected from the group consisting of minerals, rocks, and industrial waste products derived from such minerals or rocks comprising the steps of:

a. kneading particles of said alumina-bearing materials with lime and water to form a homogeneous plastic mass, said lime being present in an amount of 1 to 3 moles per mole of alumina in said alumina-bearing material;

b. forming said homogeneous plastic mass into a plurality of shaped bodies;

c. maintaining said shaped bodies under hydrothermal conditions at a temperature of up to 200° C for a time sufficient for the bodies to harden by hydraulic setting and to solubilize the alumina in the bodies by reaction with said lime;

d. comminuting the hardened bodies; and

e. leaching the solubilized alumina from the comminuted hardened bodies.

4,048,286

PROCESS FOR THE DECONTAMINATION OF WASTE MATERIALS

Viktor Rossmaier, deceased, late of Oberaudorf, Germany, by Emmy Rossmaier, heiress, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Mar. 25, 1976, Ser. No. 670,541

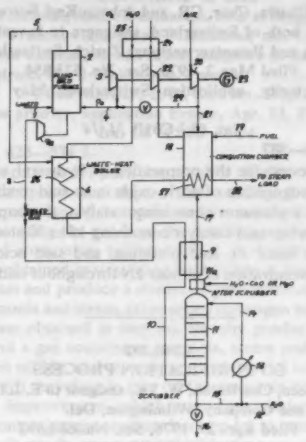
Claims priority, application Germany, Apr. 1, 1975, 2514198

Int. Cl.[2] C01B *17/60*

U.S. Cl. 423—242 10 Claims

1. A process for the decomposition of a carbonaceous and sulfur-containing waste comprising the steps of burning said waste with a combustion-sustaining gas stream having an oxygen concentration of at least 50% by volume to produce an

exhaust gas containing carbon oxides and sulfur dioxide; and scrubbing said sulfur dioxide from said exhaust gas to produce



a scrubbed gas substantially free from sulfur oxides and a scrubbing liquid containing sulfur dioxide.

4,048,287

SULFUR RECOVERY METHOD

Raymond L. Kelleher; Ivan A. Shirk, both of Spokane, Wash., and Timothy J. O'Leary, deceased, late of Spokane, Wash., assignors to The Corporation of Gonzaga University, Spokane, Wash.

Continuation of Ser. No. 429,280, Dec. 28, 1973, abandoned, which is a continuation of Ser. No. 157,951, June 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 788,460, Jan. 2, 1969, abandoned. This application Aug. 18, 1975, Ser. No. 605,330

Int. Cl.[2] C01B *17/60*

U.S. Cl. 423—242 **4 Claims**

1. In the method of removing sulfur dioxide (SO_2) from the exhaust gases of a sulfide ore smelter or the like, wherein the exhaust gases contain at least about 2% SO_2 and are subjected to liquid spray scrubbing on a continuous basis in scrubbing tower means at essentially ambient pressure to remove SO_2 prior to discharge of the gases to the atmosphere and wherein the scrubbing liquid outflow from the scrubbing tower means is processed to remove the SO_2 and at least in part recycled through the scrubbing tower means, the improvements in said method comprising:

a. by refrigeration, cooling the exhaust gases to a temperature of about 40°–60° F. prior to introduction thereof to said scrubbing tower means;

b. by refrigeration, cooling the scrubbing liquid recycled through said scrubbing tower means so that it is also at a temperature of about 40°–60° F. during contact thereof with the exhaust gases;

c. recycling the scrubbing liquid from one cycling tank to said scrubbing lower means, while simultaneously passing scrubbing liquid previously collected in another cycling tank to a solid sulfite separation state wherein lime is added to the scrubbing liquid in substantially stoichiometric proportion to precipitate and remove essentially all of the SO_2 content from the liquid as calcium sulphite, and returning the desulphitized liquid to such other cycling tank;

d. interrupting the recycling of the scrubbing liquid from the one cycling tank to the scrubbing tower means at a time when the SO_2 content thereof is still at a concentration substantially less than the saturation concentration thereof in the scrubbing liquid so that no SO_2 containing precipitate is present in the scrubbing tower means, and initiating the recycling of desulphitized scrubbing liquid to said scrubbing tower means from another cycling tank;

e. interrupting the recycling of the scrubbing liquid from such other cycling tank to the scrubbing tower means at a time when the SO_2 content thereof is still at concentration substantially less than the saturation concentration thereof in the scrubbing liquid so that no SO_2 containing precipitate is present in the scrubbing tower means; and

f. desulphitizing the scrubbing liquid in such other cycling tank in like manner as in step (c) while recycling desulphitized scrubbing liquid from the one cycling tank to the scrubbing tower means, and so on, cyclically;

the spray scrubbing of the exhaust gases being thereby carried out on a continuous basis at low temperature and without any SO_2 containing precipitate being present in the scrubbing tower means, while the scrubbing liquid is thereby desulphitized on a batch basis.

4,048,288

METHOD FOR PREVENTING EVAPORATION-CONDENSATION CAKING OF SODIUM CHLORIDE AT HIGH TEMPERATURES

Gerard C. Sinke; Martin A. Langhorst, and James A. May, Sr., all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 14, 1975, Ser. No. 558,403

Int. Cl.[2] C01D *3/26, 3/04, 3/22*

U.S. Cl. 423—267 **13 Claims**

1. A method for preventing caking in a body of granules of sodium chloride at temperatures within the range of from about 400° C up to the melting point of sodium chloride, or up to temperatures of at least about 600° C but less than the melting point of sodium chloride where melting occurs at such temperatures due to impurities in the sodium chloride, comprising:

1. dispersing throughout the sodium chloride an effective amount of a solid additive selected from the group consisting of binary oxides, carbonates, sulfates, phosphates, and hydroxides of Group II and Group IV elements, or mixtures thereof, wherein at least about 75% of the additive has a particle size sufficiently small to pass through a No. 230 sieve; and

2. following said dispersing step, maintaining the sodium chloride as granules substantially free from caking at a temperature within the above recited temperature range for a period of time greater than that for which a substantially identical body of sodium chloride having no such additive could be maintained without caking under substantially identical conditions, said maintaining step including heating said sodium chloride to said temperature if said sodium chloride is at a lesser temperature at the time said dispersing step is carried out.

4,048,289

STABILIZATION OF WET-PROCESS PHOSPHORIC ACID

Sergio Ortega Pierres, Mexico City, Mexico, assignor to Fertilizantes Fosfatados Mexicanos, S.A., Mexico City, Mexico

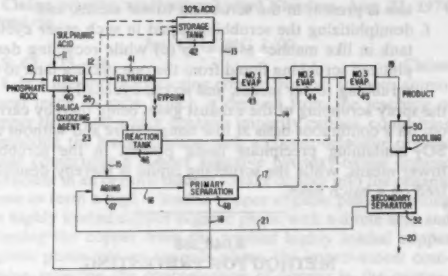
Continuation of Ser. No. 424,578, Dec. 13, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,492

Int. Cl.[2] C01B *25/16, 25/22;* C05B *7/00*

U.S. Cl. 423—317 **5 Claims**

1. A method for the preparation of merchant grade phosphoric acid stabilized against sludge formation which comprises concentrating a wet process phosphoric acid solution having a P_2O_5 content of about 28% to 32% by weight and containing in said solution Fe, Al, Si, F, and Na and K impurities to a P_2O_5 content of about 35% to 42% by weight; adding to the concentrated acid solution in a reaction tank, about 0.1 to 1.0% by weight of inorganic oxidizing agent to change the redox potential of the solution to increase the solubility of said Fe and Al impurities and to maintain same in said acid solution, adding to

said concentrated acid solution in said reaction tank about 0.1 to 1.0% of activated silica; aging the thus treated solution for a time sufficient for said silica to react with said F impurities in said concentrated acid solution and cause formation of a solid phase precipitate and a liquid phase of stabilized phosphoric acid containing substantial amounts of said Fe and Al impuri-



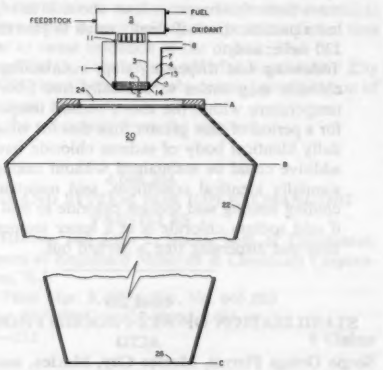
ties; separating the liquid and solid phases by a first centrifugation; concentrating the separated liquid phase from the first centrifugation to a P_2O_5 content of at least 50% by weight; separating the solids formed in the concentrated liquid phase by a second centrifugation to obtain a clarified product solution having less than 1% solids; and recycling the solids from the second centrifugation to said reaction tank.

4,048,290

PROCESS FOR THE PRODUCTION OF FINELY-DIVIDED METAL AND METALLOID OXIDES

Kam Bor Lee, Chelmsford, Mass., assignor to Cabot Corporation, Boston, Mass.

Filed Jan. 28, 1976, Ser. No. 653,116
Int. Cl.² C01B *33/18, 13/14*
U.S. Cl. 423—336 **6 Claims**



1. In a process for the production of finely-divided metal or metalloid oxides by vapor phase hydrolysis of corresponding metal or metalloid halide feedstocks in the presence of a flame provided by combustion of a hydrogen-containing fuel with an oxygen-containing gas, the improvement which comprises: flowing the feedstock vapor through burner means as one or more enclosed streams thereof and discharging it therefrom into a reaction zone, and

at the dischange end of said burner means, transpiring through a porous diffusion means a hydrogen-containing fuel gas or vapor at a fouling preventive rate along and surrounding each boundary of each such enclosed feedstock vapor-containing steam.

4,048,291

PROCESS FOR PREPARING HYDROXYLAMMONIUM SALTS

Hussain El-Ghatta, Chur, GR, and Johann Karl Forrer, Domat-Ems, GR, both of Switzerland, assignors to Inventa AG fur Forschung und Patentverwertung, Zurich, Switzerland

Filed May 2, 1975, Ser. No. 573,854
Claims priority, application Switzerland, May 10, 1974, 6406/74
Int. Cl.² C01B *21/14*
U.S. Cl. 423—387 **11 Claims**

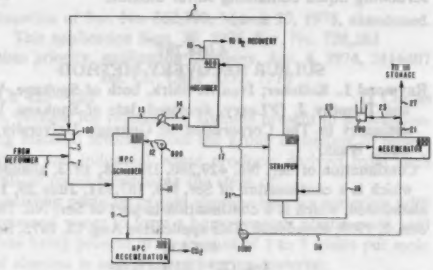
1. In a process for the preparation of hydroxyl ammonium salts by hydrogenation of nitric oxide in an acid medium in the presence of a platinum conatining catalyst, the improvement which comprises said catalyst containing 15 to 50 atom percent of selenium based on said platinum, and said acid medium having a concentration of at least 2N throughout said hydrogenation.

4,048,292

CO PURIFICATION PROCESS

Ralph V. Green, Charleston, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 29, 1976, Ser. No. 681,593
Int. Cl.² C01B *31/18;* B01D *53/34*
U.S. Cl. 423—415 A **7 Claims**



1. A process for the preparation of high purity CO from a CO_2-free gaseous stream containing at least about 25% volume CO and also containing H_2 comprising

a. countercurrently contacting the gaseous stream with a liquid aqueous absorbent solution containing dissolved therein as copper ammonium C_{1-2} acylate from 10 to 18 pbw copper in an amount equivalent to from about 0.2 to about 2.0 gallons of absorbent solution per ft^3 (26.7 – 267 l/m^3) of CO in the gaseous stream at a CO partial pressure of at least about 30 psia (2.1 kg/cm_2), by which CO reacts with the copper compound to form a stable water-soluble complex, small amounts of H_2 and other gases are absorbed into the absorbent solution and the non-absorbed and non-complexed components of the gaseous stream are separated from the absorbent solution;

b. while maintaining the absorbent solution above its decomplexing pressure, countercurrently contacting the absorbent solution with a stream of purified gaseous CO, as defined hereinbelow, by which the absorbed gases are desorbed and separated from the absorbent solution;

c. regenerating the absorbent solution from step (b) by reducing the pressure thereon to a level at which the CO is decomplexed and purified gaseous CO is separated from the absorbent solution;

d. recycling purified gaseous CO to step (b) of the process in an amount equivalent to from about 0.03 to about 0.5 ft^3 of CO per ft^3 of total gaseous CO product separated in step (c); and

e. recycling regenerated absorbent solution to step (a) of the process.

4,048,293

PROCESS FOR PURIFYING A SULFUR DIOXIDE CONTAINING GAS

Philippe Renault; André Deschamps, both of Noisy le Roe; Sigismond Franckowiak, Rueil Malmaison, and Claude Dezael, Maisons Laffitte, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Mar. 29, 1976, Ser. No. 671,711
Claims priority, application France, Apr. 11, 1975, 75.11592
Int. Cl.² C01B 17/04
U.S. Cl. 423—574 L 17 Claims

1. In a process for purifying a sulfur dioxide containing gas, which comprises the steps of (a) washing the gas with an aqueous solution of ammonia and/or ammonium sulfite and then separating the gas from the resulting aqueous solution of increased ammonium sulfites content, (b) heating the aqueous solution obtained in step (a) to decompose at least a portion of the sulfites and produce a stream of gas containing sulfur dioxide, ammonia and steam, (c) reacting hydrogen sulfide with the gas stream obtained in step (b), thereby producing elemental sulfur and a gas containing ammonia, steam and unconverted hydrogen sulfide, and separating the elemental sulfur from said gas, and (d) recycling to step (a) the ammonia obtained in step (c), the improvement which comprises subjecting the ammonia-containing gas separated in step (c) to controlled oxidation to selectively convert residual hydrogen sulfide to sulfur dioxide, and conducting step (d) by recycling ammonia and at least one member of the group consisting of sulfur dioxide and ammonium sulfite to step (a).

4,048,294

PREPARATION OF STANNIC OXIDE

Carl R. Gloskey, Wilton, Conn., and Stanley Littman, Edison, N.J., assignors to M&T Chemicals Inc., Greenwich, Conn.

Filed Nov. 3, 1975, Ser. No. 628,361
Int. Cl.² C01G 19/02
U.S. Cl. 423—618 1 Claim

1. A method for preparing particulate stannic oxide exhibiting an optical density of between 200 and 400, a bulk density of between 6.3 and 9.0 grams per cubic inch, and a Gardner color of between 3 and 6, said method comprising the steps of

a. maintaining a uniformly agitated aqueous solution of sodium stannate exhibiting a pH of between 8 and 9,
b. gradually adding to said uniformly agitated solution over a period of between 5 and 15 minutes a stoichiometric amount of an aqueous solution containing an alkali metal bicarbonate, thereby precipitating hydrated stannic oxide, and isolating said stannic oxide,
c. washing the precipitated oxide with an aqueous solution of sodium carbonate,
d. washing the precipitated oxide with aqueous sulfuric acid exhibiting a pH between 3.5 and 4,
e. calcining the hydrated stannic oxide at a temperature between 950° and 1050° C. for a period of time sufficient to convert the hydrated stannic oxide to an anhydrous form exhibiting a Gardner color of between 3 and 6, and
f. classifying the anhydrous oxide as required to remove a first fraction wherein 90% of the particles are larger than about 4 microns,
g. recovering the remaining fraction of said anhydrous oxide.

4,048,295

PROCESS FOR MAKING EXTRUDATES FROM ALUMINUM OXYHYDRATES

Martin Wassermann, Hamburg, and Arnold Meyer, St. Michaelisdonn, both of Germany, assignors to Condea Chemie GmbH, Germany

Filed Dec. 16, 1975, Ser. No. 641,170
Claims priority, application Germany, Dec. 21, 1974, 2460921
Int. Cl.² C01F 7/02
U.S. Cl. 423—626 10 Claims

1. A process consisting essentially of peptizing with an aqueous acid selected from the group consisting of nitric acid, acetic acid, citric acid, hydrochloric acid, sulfuric acid, formic acid, propionic acid, monochloracetic acid, dichloroacetic acid and trichloroacetic acid at a concentration of 0.3 to 10% a Boehmite aluminum oxyhydrate containing 65 to 85% by weight Al_2O_3, a bulk density of 500 to 700 g/l, a B.E.T. specific surface area of 140 to 300 m^2/g and an average particle size below 100 microns, then adding an aqueous solution of ammonia or an ammonia liberating compound having a concentration of 0.1 to 3%, there being employed 50 to 70 parts of acid solution and 35 to 50 parts of ammonia solution per 100 parts of aluminum oxyhydrate, to form an extrudable mass, extruding said extrudable mass, drying and then calcining the extrudate.

4,048,296

RADIOPHARMACEUTICAL SCANNING AGENTS

Robert George Wolfangel, Ballwin, Mo., assignor to Mallinckrodt, Inc., St. Louis County, Mo.

Filed May 27, 1975, Ser. No. 581,315
Int. Cl.² A61K 29/00, 43/00; G01T 1/161
U.S. Cl. 424—1 20 Claims

1. A dispersion useful in forming an injectable radiopharmaceutical scanning agent comprising a stannous sulfur colloid dispersed in an aqueous buffer solution.

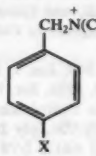
4,048,297

NOVEL QUATERNARY AMMONIUM SALTS, COMPOSITIONS AND METHODS FOR THEIR USE

Raymond E. Counsell, Ann Arbor, and Terry Ta-Jen Yu, Warren, both of Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.

Continuation of Ser. No. 526,830, Nov. 25, 1974, abandoned.
This application Dec. 18, 1975, Ser. No. 642,036
Int. Cl.² A61K 29/00, 43/00; C07C 87/30; G01T 1/161
U.S. Cl. 424—1 7 Claims

1. A compound of the formula



wherein X is iodine, ^{123}iodine, ^{125}iodine or ^{131}iodine and Y^- represents a pharmaceutically acceptable anion.

4,048,298

SOLID PHASE DOUBLE-ANTIBODY RADIOIMMUNOASSAY PROCEDURE

Gordon Dean Niswender, Fort Collins, Colo., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Feb. 25, 1975, Ser. No. 552,917
Int. Cl.² G01N 33/00; G21H 5/02
U.S. Cl. 424—1.5 10 Claims

1. In a method for determining the presence of an antigenic ligand in a body fluid suspected of containing the ligand comprising:

1. mixing together an aqueous medium
   a. a sample of the body fluid;
   b. a corresponding antigenic ligand labeled with a radioactive isotope;
   c. a soluble antibody against the antigenic ligand immunogenically produced in an animal other than that from which the sample is obtained, and
   d. a second antibody against said soluble antibody immunogenically produced in an animal other than those which the sample and said soluble antibody are derived,
2. incubating the resulting aqueous medium to allow the

unlabeled ligand, if any, in (a) and labeled ligand (b) to competitively bind on said soluble antibody (c) and to cause mutual precipitation of antibodies of (c) and (d),

3. separating the precipitated antibodies carrying bound ligand from the residual liquid medium containing free ligand, and

4. subsequently measuring the radioactivity of the precipitated antibodies or of the residual liquid, or of both to determine the content of ligand in the sample,

the improvement wherein said second antibody (d) is immobilized or insolubilized to a solid phase by polymerization with an aldehyde or alkyl haloformate; by physical entrapment in a gel polymer of an insoluble nature or by covalent coupling with a water-insoluble polymeric material or by adsorption on a water-insoluble polymeric material before it is added in step (1) above.

4,048,299

ANTICARIES CONFECTIONARIES AND ORAL HEALTH PRODUCTS

John H. Litchfield, Worthington, and Victor G. Vely, Columbus, both of Ohio, assignors to William Wrigley, Jr. Co., Chicago, Ill.

Continuation-in-part of Ser. No. 855,763, Sept. 5, 1969, Pat. No. 3,679,792, Ser. No. 855,764, Sept. 5, 1969, Pat. No. 3,629,395, Ser. No. 855,770, Sept. 5, 1969, Pat. No. 3,749,766, and Ser. No. 858,996, Sept. 18, 1969, Pat. No. 3,651,206, which is a continuation-in-part of Ser. No. 790,314, Jan. 10, 1969, abandoned. This application May 6, 1970, Ser. No. 35,246

Int. Cl.[2] A61K *5/00, 9/68, 7/16*

U.S. Cl. 424—49 **16 Claims**

1. An oral health composition comprising an effective amount of pyruvaldehyde to inhibit the acid production and growth of oral microorganisms and a dental vehicle.

4,048,300

DENTAL PREPARATION CONTAINING MATERIALS HAVING CALCIUM AND PHOSPHATE COMPONENTS

Kenneth Tomlinson, Bramhall, and Edward John Duff, Sandbach, both of England, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 431,945, Jan. 9, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 653,998

Claims priority, application United Kingdom, Jan. 11, 1973, 1633/73; July 25, 1973, 35459/73; July 25, 1973, 35471/73

Int. Cl.[2] A61K *7/18*

U.S. Cl. 424—52 **31 Claims**

1. A dental cream preparation for remineralising teeth and providing fluoride to pits and fissures of teeth which comprises about 20–75% by weight of liquid selected from the group consisting of water, humectant and mixture thereof and about 0.5–5% by weight of gelling agent proportioned to form an extrudible creamy mass and about 20% by weight to about 99% by weight of a dental polishing or abrasive agent, said polishing or abrasive agent including, in amount of about 10% by weight to about 90% by weight based on the weight of said dental preparation, a material selected from the group consisting of:

1. fluorapatite;

2. fluorohydroxyapatite;

3. apatite, calcium deficient apatite, hydroxyapatite, fluorohydroxyapatite or fluorapatite each containing monofluorophosphate ions;

4. fluorapatite or fluorohydroxyapatite wherein about 0.1–1% by weight of the calcium content of each is replaced by a non-toxic divalent metal ion selected from the group consisting of zinc, copper, cadmium, nickel, cobalt, iron, manganese, chromium, magnesium strontium and barium; and

5. hydroxyapatite substituted by a fluoro anion of a non-toxic divalent transition metal;

wherein said material is prepared by a process comprising reacting reactants at ambient temperature initially at about pH 7, maintaining this pH until equilibrium is substantially established, reducing said pH to about 4, maintaining this pH until equilibrium is substantially established, raising the pH to about 7 until equilibrium is reached and crystallite growth occurs, and repeating said fluctuating pH cycle for a total of about 2 to about 5 times terminating at pH 7, wherein said reactants to prepare said materials are selected from the group consisting of:

a. equimolar amounts of hydrofluoric acid in aqueous solution and hydroxyapatite suspended in said solution to form said fluorapatite (1);

b. hydrofluoric acid in aqueous solution and hydroxyapatite suspended in said solution, said hydrofluoric acid being present and being in an amount less than equimolar of the amount of said hydroxyapatite, to form said fluorohydroxyapatite (2);

c. calcium fluoride in aqueous solution and calcium and phosphate reactant selected from the group consisting of $CaHPO_4$; $Ca_5OH(PO_4)_3$; $CaHPO_4.2H_2O$; and phosphoric acid and a calcium salt which provides calcium and phosphate reactant to calcium fluoride up to a molar ratio of about 20:1, to form said fluorapatite (1) or said fluorohydroxyapatite (2);

d. a monofluorophosphate salt in aqueous solution and a material selected from the group consisting of apatite, calcium deficient apatite of the formula: $Ca_{10-y}H_y(OH)_{2-y}(PO_4)_6.nH_2O$ where $0 \leqq n \leqq 10$ and $0 \leqq y \leqq 2$, hydroxyapatite, flurohydroxyapatite and fluorapatite, the amount of said monofluorophosphate salt being up to about equimolar to the amount of said material, to form said material (3) which is substituted with monofluorophosphate ions;

e. a water-soluble non-fluoride compound which provides a non-toxic divalent metal ion selected from the group consisting of zinc, copper, cadmium, nickel, cobalt, iron, manganese, chromium, magnesium, strontium and barium and a suspension of fluorapatite or fluorohydroxyapatite to form the fluorapatite or fluorohydroxyapatite (4) material in which about 0.1–1% by weight of the calcium thereof is replaced by said nontoxic divalent metal ion;

f. hydrogen fluoride or a water-soluble alkali metal salt thereof and a suspension of hydroxyapatite to form said fluorapatite or fluorohydroxyapatite (4) in which about 0.1–1% by weight of the calcium thereof is replaced by a non-toxic divalent metal ion selected from the group consisting of zinc, copper, cadmium, nickel, cobalt, iron, manganese, chromium, magnesium, strontium and barium which is formed in a reaction of said process (e) between a water-soluble non-fluoride compound of a compound which provides said non-toxic divalent metal ion and hydroxyapatite in suspension; and

g. a compound which provides a fluoride ion and a compound which provides a non-toxic divalent transition metal ion selected from the group consisting of zinc, copper, cadmium, nickel, cobalt, iron, manganese and chromium simultaneously and hydroxyapatite in a slurry, the amount of said divalent transition metal ion being about 0.1–1% by weight of the calcium in said apatite, said compound which provides a fluoride ion being in amount sufficient to react with said transition metal ion, to form said apatite (5) in which orthophosphate groups in said hydroxyapatite are replaced by said fluroanion of the transition metal.

4,048,301

SHAMPOO COMPOSITION CONTAINING A DETERGENT AND A GRAFT CATIONIC COPOLYMER

Christos Papantoniou, Epinay-sur-Seine, France, assignor to L'Oreal, Paris, France

Filed May 27, 1976, Ser. No. 690,782

Claims priority, application Luxembourg, May 28, 1975, 72593

Int. Cl.[2] A61K 7/06

U.S. Cl. 424—70 8 Claims

1. A cosmetic shampoo composition for treating the hair comprising a cosmetic carrier for application to the hair, at least one detergent in an amount between 0.2 and 25 weight percent based on the total weight of said composition and at least one graft cationic polymer of

a. 3 to 95 weight percent N-vinylpyrrolidone,

b. 3 to 95 weight percent dimethylaminoethyl methacrylate, and

c. 2 to 50 weight percent polyethylene glycol,

said graft cationic copolymer being present in an amount between 0.1 and 5 weight percent based on the total weight of said composition and having a molecular weight ranging between 10,000 and 1,000,000.

4,048,302

AQUEOUS PESTICIDAL SOLUTIONS CONTAINING POLYETHYLENE GLYCOL

William R. Coleman, Miami, and Thomas E. Duffey, Hialeah, both of Fla., assignors to Riviana Foods Inc., Houston, Tex.

Filed June 3, 1974, Ser. No. 476,061

Int. Cl.[2] A61K 31/74

U.S. Cl. 424—78 3 Claims

1. An aqueous pesticidal solution for the treatment of the skin and costs of domesticated animals to kill fleas, ticks, lice, mites, cattle face flies and hornflies consisting essentially of a solution of about 5 to 15 weight percent of o-isopropoxyphenyl methycarbamate and about 95 to 85 weight percent polyethylene glycol having a molecular weight of about 200 to 600 dissolved in about 10 to 50 parts by weight water per part of the combined weights of said o-isopropoxyphenyl methylcarbamate and said polyethylene glycol.

4,048,303

METHOD OF PREPARING ENZYME CHOLIC ACIDS COMPLEX

Jean Boige, Aulnay sous Bois, France, assignor to L'Opochimie, Fontvieille, Monaco

Filed Nov. 11, 1975, Ser. No. 630,763

Claims priority, application United Kingdom, Nov. 29, 1974, 51853/74

Int. Cl.[2] A61K 37/48, 35/38

U.S. Cl. 424—94 3 Claims

1. A method of preparing an enzyme-hormone complex containing between approximately 8 and 12 units/mg of enterokinase, more than 40 units/mg of maltase, more than 10 units/g of alkaline phosphatase, more than 2 units/mg of aminopeptidase and trehalase, glutamyl transferase, ornithine carbamyl transferase, saccharase, lactase, enterogastrone, secretin, cholecystokinin, caerulin and pancreozymin, from the small intestine of pigs or bullocks, comprising the steps of:

a. mixing pieces of fresh or refrigerated small intestine with an aqueous solution containing between 100 and 600 g of cholic acids constituted by a mixture of cholic acid, desoxycholic acid, glycocholic acid and taurocholic acid and between 50 and 400 ml of polyethylene glycol mono-para (1,1,3,3 tetramethyl butyl)phenyl ether per 100 liters of water, the proportion of said aqueous solution being between about 100 and about 250 liters per 100 kg of small intestine;

b. maintaining the resulting mixture for about 2 to about 12 hours at a temperature between 0 to 5° C and at a pH of about 6 to 7; and

c. separating from the mixture the treated pieces of small intestine by filtration in order to obtain a solution containing said enzymes and hormones.

4,048,304

POLYCYCLIC ETHER ANTIBIOTIC FOR COMBATING INSECTS

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett; John R. Oscarson, both of Groton, and John B. Routien, Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 548,421, Feb. 10, 1975. This application Mar. 1, 1976, Ser. No. 662,700

Int. Cl.[2] A61K 35/74

U.S. Cl. 424—122 5 Claims

1. The method of combatting insects which comprises contacting said insects with an effective insecticidal amount of antibiotic compound 38,986 or a cationic salt thereof, said antibiotic compound when in the form as the free acid having an optical rotation of $[a]_D^{25°} = -7.5°$ at a concentration of 1% of acetone; an average composition by weight of 65.11% carbon, 9.54% hydrogen and 25.35% oxygen (by difference); and, when pelleted in KBr, exhibiting characteristic absorption in the infrared region at the following wavelengths in microns: 2.98, 3.44, 5.75, 5.78, 6.85, 7.24, 7.98, 8.38, 8.65, 9.00, 9.23, 9.42, 9.67, 9.83, 10.10, 10.38, 10.92, 11.18, 11.45, 11.85, 13.40, 13.70 and 14.10.

4,048,305

TRIPEPTIDES, THEIR ESTERS AND AMIDES, AND ANTI-ULCERA ACTIVITY THEREOF

Luigi Molteni, Malnate, Varese; Gian Piero Vercesi, Rho, Milan, and Eraldo Antonini, Rome, all of Italy, assignors to Dr. L. Zambeletti S.p.A., Milan, Italy

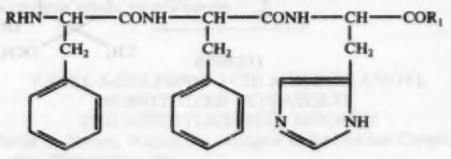
Filed Apr. 8, 1976, Ser. No. 674,947

Claims priority, application Italy, Apr. 9, 1975, 22190/75

Int. Cl.[2] A61K 37/00

U.S. Cl. 424—177 9 Claims

1. Tripeptides of the general formula:



wherein

R = — H, $COCH_3$, alkyl

R_1 = —OH, $—NH_2$, —NH alkyl (C_1–C_5) —O alkyl (C_1–C_5)

resulting from condensing of racemic, levorotatory and dextrorotatory phenylalanine and histidine.

9. A pharmaceutical composition with anti-ulcer activity, containing, as an active element, 50 to 400 mg of one or more of the tripeptides of claim 1.

4,048,306

ALDEHYDE-ERYTHROMYCYLAMINE CONDENSATION PRODUCTS

Roland Maier; Eberhard Woitun; Bernd Wetzel, all of Biberach; Wolfgang Reuter, Laupertshausen; Hanns Goeth, Biberach, and Uwe Lechner, Ummendorf, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

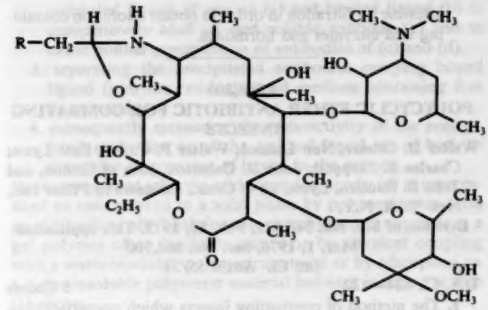
Filed Mar. 29, 1976, Ser. No. 671,421

Claims priority, application Germany, Apr. 7, 1975, 2515075; Feb. 14, 1976, 2606030

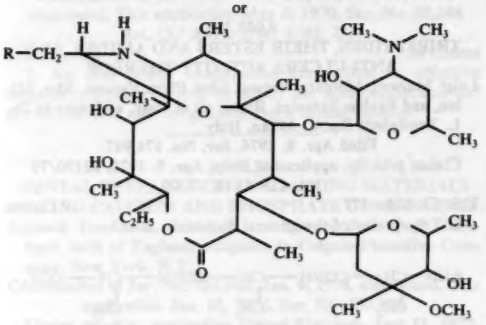
Int. Cl.[2] A61K 31/70

U.S. Cl. 424—180 13 Claims

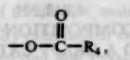
1. An erythromycylamine-aldehyde condensation product of the formula



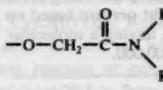
or



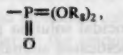
wherein R is hydroxyl; phenoxy; phenyl-(alkoxy of 1 to 3 carbon atoms); alkoxy of 1 to 4 carbon atoms; hydroxy-(alkoxy of 1 to 4 carbon atoms); (alkoxy of 1 to 3 carbon atoms)-(alkoxy of 1 to 4 carbon atoms); di(alkyl of 1 to 3 carbon atoms)amino-(alkoxy of 1 to 4 carbon atoms); (alkoxy of 1 to 3 carbon atoms)-carbonyl(alkoxy of 1 to 4 carbon atoms); mercapto; phenyl-mercapto, where the phenyl moiety is unsubstituted or methyl-, methoxy-, ethoxy-, isopropoxy- or propoxy-substituted; phenyl-(alkyl of 1 to 3 carbon atoms)-mercapto; (straight or branched alkyl of 1 to 5 carbon atoms)-mercapto; cyclohexyl-mercapto; hydroxy-(alkyl of 1 to 3 carbon atoms)-mercapto; di(alkyl of 1 to 3 carbon atoms)amino-(alkyl of 1 to 3 carbon atoms)-mercapto; (alkoxy of 1 to 3 carbon atoms)-carbonyl-(alkyl of 1 to 3 carbon atoms)-mercapto; cyano-(alkyl of 1 to 3 carbon atoms)-mercapto; $-NR_2R_3$, where R_2 and R_3, which may be identical to or different from each other, are each hydrogen, phenyl, phenyl-(alkyl of 1 to 3 carbon atoms), alkyl of 1 to 4 carbon atoms or, together with each other and the nitrogen atom to which they are attached, a 5- to 6-membered monocyclic heterocyclic ring which may contain an oxygen, sulfur or additional nitrogen atom;



where R_4 is straight or branched alkyl of 1 to 5 carbon atoms, benzyl or phenyl; —NH—CO—R_5, where R_5 is straight or branched alkyl of 1 to 5 carbon atoms, mono- or dihalo-substituted-(alkyl of 1 to 5 carbon atoms), cyano-(alkyl of 1 to 5 carbon atoms), phenyl-(alkyl of 1 to 3 carbon atoms) where the phenyl moiety may be mono- or di- or trimethoxy- or mono- or di-halo-substituted and the alkyl moiety may be monohalo-substituted, phenoxy-(alkyl of 1 to 3 carbon atoms), phenyl-(alkenyl of 2 to 4 carbon atoms), phenyl or phenyl having one or more methyl, hydroxyl, methoxy, nitro or chloro substituents attached thereto; or R_5 is pyridyl; furyl; fluoro-furyl; thienyl; N-phenyl-carbamoyl;



where R_6 and R_7, which may be identical to or different from each other, are each methyl, ethyl, propyl or isopropyl;



where R_8 is straight or branched alkyl of 1 to 5 carbon atoms; —NH—SO_2—R_9, where R_9 is alkyl of 1 to 4 carbon atoms or phenyl or (alkyl of 1 to 3 carbon atoms)-phenyl; or —SO_2—R_{10}, where R_{10} is alkyl of 1 to 3 carbon atoms or phenyl or (alkyl of 1 to 3 carbon atoms)-phenyl;
or a non-toxic, pharmacologically acceptable acid addition salt thereof.

13. The method of combatting bacterial infections in a warm-blooded host, which comprises perorally or parenterally administering to said host an effective antibacterial amount of a compound of claim **1.**

4,048,307

CYCLIC ADENOSINE MONOPHOSPHATE 8-SUBSTITUTED DERIVATIVES

Takeshi Yokota, Funabashi; Nobuyuki Suzuki, Hyuga; Tsuneo Sowa, Nobeoka; Yasuharu Sasaki, Nobeoka, and Yasutaka Ono, Nobeoka, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

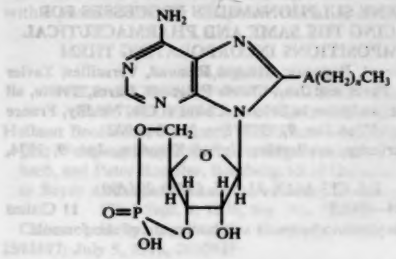
Filed Sept. 24, 1975, Ser. No. 616,356

Claims priority, application Japan, Dec. 26, 1974, 49-3185; Dec. 27, 1974, 49-148935

Int. Cl.[2] **A61K** *31/70;* **C07H** *19/20*

U.S. Cl. 424—180 **37 Claims**

1. A cyclic adenosine monophosphate represented by the formula, or its pharmaceutically acceptable non-toxic inorganic or organic salt:



wherein A stands for —S— or —NH— and *n* is an integer of from 5 to 12.

31. A method of treating diseases caused by disorder of the intracellular cyclic adenosine monophosphate level which comprises administering to a patient suffering from such disease an effective amount of a cyclic adenosine monophosphate or pharmaceutically acceptable non-toxic inorganic or organic salt thereof according to claim **1.**

4,048,308

ACELLULAR PLANKTONIC PRODUCT, METHOD OF PREPARING SAME AND COSMETIC COMPOSITION CONTAINING THE SAME

Lucien Paul Aubert, Nice, France, assignor to L'Oreal, Paris, France

Filed July 21, 1975, Ser. No. 597,571

Claims priority, application Luxembourg, July 24, 1974, 70601

Int. Cl.² A61K *35/78*

U.S. Cl. 424—195 **8 Claims**

1. A cosmetic composition for application to the skin consisting essentially of an aqueous solution or suspension or an accellular planktonic product consisting essentially of the cytoplasmic content of cellular planktonic membranes of sulfurous spa origin, said planktonic product being an emollient and being present in an effective amount to produce an emollient or softening effect on the skin.

4,048,309

TOPICAL STEROID OINTMENT FORMULATIONS

James Ling Chen, East Brunswick, and Jean M. Battaglia, North Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 24, 1976, Ser. No. 660,964

Int. Cl.² A61K *31/56*

U.S. Cl. 424—238 **22 Claims**

1. A non-aqueous composition for topical application in the form of an ointment, gel or lipophilic stick comprising at least one steroid selected from the group consisting of 21-chloro-9α-fluoro-Δ⁴-pregnene-11β,16α,17α-triol-3,20-dione 16,17-acetonide; 21-chloro-9-fluoro-2',3'-dihydro-11β-hydroxy-5'-phenylpregna-1,4-dieno[16α,17-b][1,4]dioxin3,20-dione:dichloro methane solvate (1:1), and 9α-fluoro-11β,16α,17,21-tetrahydroxy-pregna-1,4-diene-3,20-dione 16,17-acetonide, a ricinoleate vehicle in which said steroid is at least partially soluble, and an oleaginous material, said oleaginous material is selected from the group consisting of petrolatum, mineral oil thickened or gelled with polyethylene, high molecular weight paraffin waxes, mono and diglycerides of fatty acids gelled with high molecular weight fatty acids or polyamide complex of hydroxystearate, propylene glycol isostearate or isostearyl alcohol gelled with high molecular weight fatty acids and mixtures thereof.

13. A composition useful as a vehicle for steroids in the form of a lipophilic stick, comprising a ricinoleate and an oleaginous material selected from the group consisting of petrolatum, mineral oil thickened or gelled with polyethylene, high molecular weight paraffin waxes, mono and diglycerides of fatty acids gelled with high molecular weight fatty acids or polyamide complex of hydroxystearate, propylene glycol isostearate or isostearyl alcohol gelled with high molecular weight fatty acids and mixtures thereof, said ricinoleate being present in an amount within the range of from about 50 to about 70% by weight of the composition and said oleaginous material being present in an amount within the range of from about 20 to about 50% by weight of the composition, and a steroid present in an amount within the range of from about 0.005 to about 0.6% by weight of the total composition said steroid being selected from the group consisting of 21-chloro-9-fluoro-2',3'-dihydro-11β-hydroxy-5'-phenylpregna-1,4-dieno[16α,17-b][1,4]dioxin-3,20-dione:dichloro methane solvate (1:1), 21-chloro-9α-fluoro-Δ⁴-pregnene-11β,16α,17α-triol-3,20-dione 16,17-acetonide, and 9α-fluoro-11β,16α,17,21-tetrahydroxy-pregna-1,4-diene-3,20-dione 16,17-acetonide.

4,048,310

TOPICAL STEROID FORMULATION IN FORM OF LOTION OR CREAM

James Ling Chen, East Brunswick, and Jean M. Battaglia, North Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 24, 1976, Ser. No. 660,963

Int. Cl.² A61K *31/56, 31/58*

U.S. Cl. 424—238 **25 Claims**

1. A composition for topical application in the form of a cream or lotion, comprising at least one steroid wherein said steroid is selected from the group consisting of 21-chloro-9α-fluoro-Δ⁴-pregnene-11β, 16α,17α-triol-3,20-dione 16,17-acetonide; 21-chloro-9-fluoro-2',3'-dihydro-11β-hydroxy-5'-propylpregna-1,4-dieno[16α,17-b][1,4]-dioxin-3,20-dione:dichloro methane solvate (1:1); and 9α-fluoro-11β, 16α,17,21-tetrahydroxy-pregna-1,4-diene-3,20-dione 16,17-acetonide, a ricinoleate vehicle in which said steroid is at least partially soluble, an emulsifier-thickener comprising a polyethylene glycol ether of a fatty alcohol, an oleaginous material or emollient, a preservative and water.

25. The composition as defined in claim **1** further including propylene glycol monostearate.

4,048,311

7-ACYL-3-(SULFONIC ACID AND SULFAMOYL SUBSTITUTED TETRAZOLYL THIOMETHYL)CEPHALOSPORINS

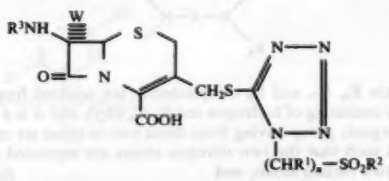
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 647,394, Jan. 8, 1976, abandoned, which is a continuation-in-part of Ser. No. 559,609, March 18, 1975, abandoned. This application May 19, 1976, Ser. No. 687,792

Int. Cl.² C07D *501/20*; A61K *31/545*

U.S. Cl. 424—246 **31 Claims**

1. A compound of the formula



in which:

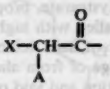
W is hydrogen or methoxy;

each individual R^1 is hydrogen or lower alkyl;

n is one to ten;

R^2 is hydroxy, amino, lower alkylamino or di(lower)alkylamino;

R^3 is an acyl group of the formula:



where:

X is thienyl; dihydrophenyl; phenyl; phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido or carboxymethylamino; or 3-fluoro-4-hydroxyphenyl; and

A is NH_2, OH, COOH or SO_3H; or formyloxy when X is phenyl;

or a non-toxic pharmaceutically acceptable salt thereof.

21. An antibacterial pharmaceutical composition comprising a compound as claimed in claim **1** and a pharmaceutically acceptable carrier therefor.

4,048,312

2,4-DIAMINOQUINAZOLINES AS ANTITHROMBOTIC AGENTS

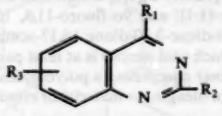
William B. Lacefield, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 411,115, Oct. 30, 1973, Pat. No. 3,956,495. This application Dec. 4, 1975, Ser. No. 637,781

Int. Cl.[2] A61K *31/535, 31/505*

U.S. Cl. 424—248.56 **23 Claims**

1. A method of inhibiting platelet aggregation in a warm-blooded animal in need of such inhibition which comprises parenterally administering to said animal an effective and nontoxic amount of a compound of the formula,

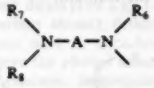


wherein R_1 and R_2 are monovalent groups independently selected from the group consisting of

a.

wherein R_4 and R_5 independently are selcted from the group consisting of hydrogen, C_1–C_6 alkyl, and cycloalkyl having fewer than about 12 carbon atoms, with the proviso that both R_4 and R_5 cannot be cycloalkyl;

b.



wherein R_6, R_7, and R_8 independently are selected from the group consisting of hydrogen and C_1-C_6 alkyl, and A is a divalent organic group having from about two to about six carbon atoms such that the two nitrogen atoms are separated by at least two carbon atoms; and

c. monocyclic heterocyclic-amino consisting of substituted or unsubstituted five- or six-membered single heterocyclic rings having no more than about 12 atoms and containing one nitrogen hetero atom and one oxygen hetero atom as the only hetero atoms; with the proviso that at least one of R_1 and R_2 must be selected from group (c); and

R_3 is selected from the group consisting of hydrogen, halogen, and C_1-C_3 alkyl; and physiologically-acceptable salts thereof.

4,048,313

BENZENE SULPHONAMIDES PROCESSES FOR PRODUCING THE SAME AND PHARMACEUTICAL COMPOSITIONS INCORPORATING THEM

Michel Vincent, Bagneux; Georges Remond, Versailles; Xavier Pascaud, Paris, and Jean-Claude Poignant, Bures, Yvette, all of France, assignors to Science Union et Cie, Neuilly, France

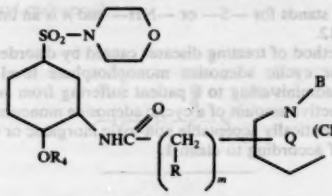
Filed Jan. 9, 1975, Ser. No. 540,032

Claims priority, application United Kingdom, Jan. 9, 1974, 959/74

Int. Cl.[2] A61K *31/535;* **C07D** *295/00*

U.S. Cl. 424—248.5 **11 Claims**

1. A *m* acylamino benzene sulphonamide of the formula



wherein

B is lower alkyl,

m is zero or an integer of 1 to 4, *g* is zero, 1, or 2, R is a hydrogen atom or a lower alkyl group,

R_4 is lower alkyl or lower alkenyl;

wherein the heterocycle designated Q is joined to the $(CH_2)_m$ group at positions 2 or 3 of the said heterocycle.

10. A method for stimulating gastric evacuation while inhibiting emesis and gastric secretions in warm-blooded animals suffering from digestive ailments which are in need of the foregoing stimulation of gastric evacuation which consists in administering to said patients a safe but effective amount of a compound of claim **1** or salt thereof.

4,048,314

MORPHOLINO CONTAINING 4-ARYLPIPERIDINE DERIVATIVES

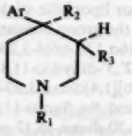
Rudolph Kubela, Cote St. Luc, Canada, and Jose Maria Do Nascimento, Moscavide, Portugal, assignors to Delmar Chemicals Limited, Ville la Salle, Canada

Filed Dec. 17, 1974, Ser. No. 533,642

Int. Cl.[2] C07D *413/04*

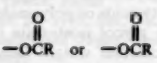
U.S. Cl. 424—248.55 **4 Claims**

1. A 4-arylpiperidine derivative of the formula I:



I

wherein R_1 is hydrogen, lower alkyl, phenyl or phenyl lower alkyl; one of R_2 and R_3 represents morpholino, and the other of R_2 and R_3 represents hydroxyl,



wherein R is lower alkyl; and Ar represents phenyl or naphthyl; or a pharmaceutically acceptable addition salt thereof with an organic acid or inorganic acid.

4. An antidepressant pharmaceutical composition comprising an effective amount of said 4-arylpiperidine derivative of

claim 1, as the active antidepressant ingredient, in combination with a pharmaceutically acceptable carrier or diluent thereof.

4,048,315

PREPARATION OF NEW 1,3-IDENTICALLY SUBSTITUTED-TRIAZINE-2,4-DIONES

Hellmut Bredereck, Stuttgart; Willi Kantlehner, Aalen-Dewangen; Wolfgang Kugel, Stuttgart; Edgar Mohring, Berg. Gladbach, and Peter Roessler, Bensberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

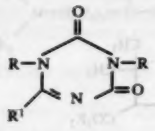
Filed Sept. 9, 1976, Ser. No. 722,300

Claims priority, application Germany, Sept. 30, 1975, 2543497; July 9, 1976, 2630849

Int. Cl.[2] C07D *251/20;* **A61L** *13/00;* **A01N** *9/22*

U.S. Cl. 424—249 **13 Claims**

1. A 1,3-identically substituted-triazine-2,4-dione of the formula



(I)

in which

each R is the same and is alkyl with 2 to 6 carbon atoms, cycloalkyl with 5 or 6 carbon atoms, phenyl, naphthyl, or phenyl or naphthyl substituted by halogen, nitro or alkyl with 1 to 4 carbon atoms, and

R^1 is hydrogen or alkyl with 1 to 4 carbon atoms.

4,048,316

COMPOSITION FOR ANTAGONIZING THE NARCOTIC EFFECTS OF BARBITURATE ADDICTION AND WITHDRAWAL EFFECTS, AND FOR TREATMENT OF BARBITURATE POISONING

Nathar W. Penn, 463 Glendale Road, Wyckoff, N.J. 07481

Filed Mar. 4, 1974, Ser. No. 447,659

Int. Cl.[2] A61K *31/505*

U.S. Cl. 424—251 **2 Claims**

1. An intravenous composition for antagonizing the narcosis effect of barbiturates which comprises.

5-hydroxymethylcytosine 0.7 to 1.4 Gm

thymine 0.27 to 0.55 Gm

pyridoxal hydrochloride 0.2 to 0.5 Gm

nicotinamide 0.5 to 2.0 Gm

thiamine hydrochloride 0.04 to 0.09 Gm

4,048,317

CHROMAN DERIVATIVES

Eric Alfred Watts, Harlow, England, assignor to Beecham Group Limited, England

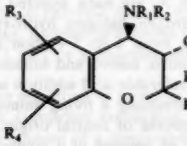
Filed May 14, 1975, Ser. No. 577,614

Claims priority, application United Kingdom, May 31, 1974, 24348/74

Int. Cl.[2] C07D *405/04;* **A61K** *31/445*

U.S. Cl. 424—267 **55 Claims**

1. A compound of the formula (I):



(I)

or a pharmaceutically acceptable acid addition salt thereof wherein

NR_1R_2 is a 3- to 8-membered heterocycle wherein the nitrogen atom is the only heteroatom, unsubstituted or substituted by 1 or 2 methyl groups;

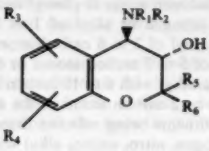
R_3 is hydrogen, halogen, alkyl of 1 to 6 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms in the alkyl moiety, dialkylamino of 1 to 6 carbon atoms in each alkyl moiety, nitro, trifluoromethyl or lower alkanoylamino of 2 to 7 carbon atoms;

R_4 is hydrogen, halogen, methyl or methoxy;

R_5 is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl; and

R_6 is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl.

20. A pharmaceutical composition useful for treating hypertension in humans and animals which comprises an antihypertensively effective amount of a compound of the formula (I)



(I)

or a pharmaceutically acceptable acid addition salt thereof wherein

NR_1R_2 is a 3- to 8-membered heterocycle wherein the nitrogen atom is the only heteroatom, unsubstituted or substituted by 1 or 2 methyl groups;

R_3 is hydrogen, halogen, alkyl of 1 to 6 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms in the alkyl moiety, dialkylamino of 1 to 6 carbon atoms in each alkyl moiety, nitro, trifluoromethyl or lower alkanoylamino of 2 to 7 carbon atoms;

R_4 is hydrogen, halogen, methyl or methoxy;

R_5 is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl; and

R_6 is hydrogen, alkyl of 1 to 6 carbon atoms or phenyl;

in combination with a pharmaceutically acceptable carrier.

4,048,318

1-SUBSTITUTED-1,2,4-TRIAZOLE FUNGICIDES

Werner Meiser; Karl Heinz Buchel; Wolfgang Krämer, all of Wuppertal, and Ferdinand Grewe, Burscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

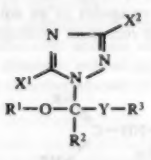
Division of Ser. No. 550,242, Feb. 14, 1975, which is a continuation-in-part of Ser. No. 318,963, Dec. 27, 1972, Pat. No. 3,912,752. This application July 9, 1975, Ser. No. 594,487

Claims priority, application Germany, Jan. 11, 1972, 2201063

Int. Cl.[2] A01N *9/00*

U.S. Cl. 424—269 **15 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of a 1,2,4-triazole derivative of the formula



in which

X^1 represents hydrogen or alkyl of 1 to 3 carbon atoms,

X^2 represents hydrogen or alkyl of 1 to 3 carbon atoms,

R^1 represents alkyl of 1 to 8 carbon atoms, alkenyl or alkynyl of 2 to 6 carbon atoms, cycloalkyl or cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl or aralkyl with 6 to 10 carbon atoms in the aryl moiety and 1 or 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, nitro,

amino, alkyl with 1 to 6 carbon atoms, alkoxy or alkylthio with 1 to 4 carbon atoms, haloalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, haloalkylthio with 1 or 2 carbon atoms and with 3 to 5 halogen atoms, haloalkyl sulfonyl with 1 or 2 carbon atoms and 1 halogen atom, o-phenyl and p-phenyl,

R^2 represents hydrogen or alkyl of 1 to 8 carbon atoms, alkenyl or alkynyl of 2 to 6 carbon atoms, cycloalkyl or cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl or aralkyl with 6 to 10 carbon atoms in the aryl moiety and 1 or 2 carbon atoms in the alkyl moiety, the optional substituents being selected form the group consisting of halogen, nitro, amino, alkyl with 1 to 6 carbon atoms, alkoxy or alkylthio with 1 to 4 carbon atoms, haloalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, haloalkylthio with 1 or 2 carbon atoms and 3 to 5 halogen atoms, haloalkyl sulfonyl with 1 or 2 carbon atoms and 1 halogen atom, O-phenyl and p-phenyl,

R^3 represents hydrogen or alkyl of 1 to 8 carbon atoms, alkenyl or alkynyl of 2 to 6 carbon atoms, cycloalkyl or cycloalkenyl of 5 to 7 carbon atoms, or optionally substituted aryl or aralkyl with 6 to 10 carbon atoms in the aryl moiety and 1 or 2 carbon atoms in the alkyl moiety, the optional substituents being selected from the group consisting of halogen, nitro, amino, alkyl with 1 to 6 carbon atoms, alkoxy or alkylthio with 1 to 4 carbon atoms, haloalkyl with 1 or 2 carbon atoms and 1 to 5 halogen atoms, haloalkylthio with 1 or 2 carbon atoms and 3 to 5 halogen atoms, haloalkyl sulfonyl with 1 or 2 carbon atoms and 1 halogen atom, o-phenyl and p-phenyl, and

Y represents —CO—, $C(OH)_2$— or —$C(OR)_2$— wherein R is methyl or ethyl,

or a salt thereof, in admixture with a diluent.

4,048,319

METHOD OF INHIBITING HISTAMINE ACTIVITY WITH QUANIDINE COMPOUNDS

James Whyte Black, Hemel Hempstead; Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

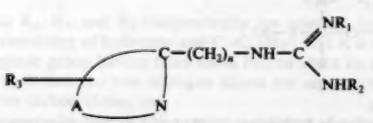
Division of Ser. No. 526,767, Nov. 25, 1974, Pat. No. 3,968,216, which is a division of Ser. No. 310,302, Nov. 29, 1972, Pat. No. 3,868,457, which is a continuation-in-part of Ser. No. 80,795, Oct. 14, 1970, abandoned. This application Mar. 19, 1976, Ser. No. 668,364

Claims priority, application United Kingdom, Oct. 29, 1969, 52891/69

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 **5 Claims**

1. A method of inhibiting H-2 histamine receptors, said H-2 histamine receptors being those histamine receptors which are not inhibited by mepyramine but are inhibited by burimamide, which comprises administering internally to an animal requiring inhibition of said H-2 histamine receptors in an amount sufficient to inhibit said H-2 histamine receptors a compound of the formula:



in which:

n is 2 to 5;

A taken together with the carbon and nitrogen atoms to which it is attached forms a triazole;

R_1 is hydrogen, alkyl having 1 to 4 carbon atoms or benzyl;

R_2 is hydrogen, alkyl having 1 to 4 carbon atoms, benzyl, imidazolylethyl or amino or R_1 and R_2 together form an ethylene bridge and

R_3 is hydrogen, alkyl having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms or amino or pharmaceutically acceptable acid addition salts thereof.

4,048,320

PENICILLINS

John Peter Clayton, Horsham, and Peter Hubert Bentley, Rudgwick, both of England, assignors to Beecham Group Limited, England

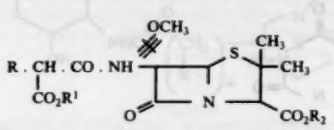
Filed Jan. 7, 1976, Ser. No. 647,131

Claims priority, application United Kingdom, Jan. 17, 1975, 2021/75; June 17, 1975, 25669/75; Aug. 16, 1975, 34182/75

Int. Cl.² A61K *31/43*; C07D *499/50*

U.S. Cl. 424—271 **7 Claims**

1. A compound of formula (I):



(I)

where R is 2- or 3- thienyl and R^1 is hydrogen or a pharmaceutically acceptable salting ion and R^2 is hydrogen, or a pharmaceutically acceptable salting ion or conventional pharmaceutically acceptable hydrolysable ester radical.

4,048,321

DISUBSTITUTED AZABICYCLOALKANES

Laszlo Beregi, Boulogne, Seine; Pierre Hugon, Rueil-Malmaison; Xavier Pascaud, Paris, and Jean-Claude Poignant, Bures, Yvette, all of France, assignors to Science Union et Cie, Suresnes, France

Division of Ser. No. 525,623, Nov. 20, 1974, Pat. No. 3,972,994. This application May 13, 1976, Ser. No. 685,756

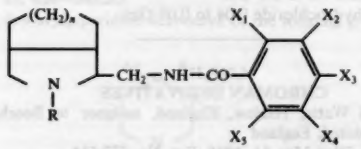
Claims priority, application United Kingdom, Dec. 14, 1973, 58034/73

Int. Cl.² A61K *31/40*; C07D *207/12*

U.S. Cl. 424—274 **11 Claims**

1. A compound selected from the group consisting of:

A. Disubstituted azabicycloalkanes of the general formula I:



I

wherein:

n is 1;

R is selected from the group consisting of saturated and unsaturated aliphatic hydrocarbon having from 1 to 5 carbon atoms inclusive in straight and branched chain, and,

X_1, X_2, X_3, X_4 and X_5 are each selected from the group consisting of hydrogen, halogen, hydroxy, alkyl and alkoxy each having from 1 to 5 carbon atoms inclusive, trifluoromethyl, nitro, amino, and sulfamoyl, and,

B. Physiologically tolerable acid addition salts thereof.

11. A method for treatiang a living animal body afflicted with a nauseous syndrome of central origin, comprising the step of administering an amount of a compound of claim **1**, which is effective for the alleviation of the said condition.

4,048,322

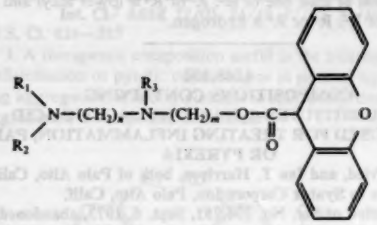
BRONCHIALLY EFFECTIVE XANTHENE-9-CARBOXYLATES

Egon Kárpáti; László Szporny, both of Budapest; Mihaly Bartók, Szeged; József Czombos, Szeged; Károly Felfoldi, Szeged; Marta Laszlavik, Szeged, and Ferenc Notheisz, Szeged, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar R.T., Budapest, Hungary

Filed Apr. 2, 1976, Ser. No. 673,135
Claims priority, application Hungary, June 27, 1975, RI 569
Int. Cl.² C07D *311/84*
U.S. Cl. 424—283 9 Claims

1. A xanthene-9-carboxylate of the formula (I),

(I)



wherein

R_1 and R_3 are the same or different and each is lower alkyl, R_2 is lower alkyl and n and m each are integers of 2 to 5, or a pharmaceutically effective salt thereof.

5. A pharmaceutical composition with cholinolytic and bronchospasmolytic effect containing as active ingredient a compound as defined in claim 1 of the formula (I), along with a carrier of diluent.

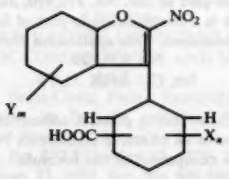
4,048,323

ANTIMICROBIAL (2-NITRO-3-BENZOFURANYL)-BENZOIC ACIDS

Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Continuation-in-part of Ser. No. 616,275, Sept. 24, 1975, abandoned. This application Sept. 20, 1976, Ser. No. 724,719
Int. Cl.² A01N *9/28;* C07D *307/82*
U.S. Cl. 424—285 10 Claims

1. A compound of the formula



wherein X is fluorine, chlorine, lower alkyl or lower alkoxy, Y is methyl, methoxy, fluorine or chlorine and m and n are independently zero, 1 or 2 or a pharmaceutically acceptable salt thereof.

8. A method for inhibiting or arresting the growth of microorganisms which comprises contacting said microorganisms with an effective amount of a compound of claim 1.

4,048,324

FUNGICIDAL COMPOSITION AND METHOD

Armand Kohn, 5, Avenue Foch, 92 Garches, France

Filed Dec. 24, 1974, Ser. No. 536,159
Claims priority, application France, June 10, 1974, 74.19891; Dec. 28, 1973, 73.46835
Int. Cl.² A01N *11/04*
U.S. Cl. 424—294 24 Claims

1. A fungicidal composition comprising a mixture of

a. at least one amine or amino acid of the formula

$$R—NH\,(CH_2)_n\,Z—(CH_2)_m\,Z^1—(CH_2)_p\,Z^2$$

wherein R is alkyl or alkenyl of 4–18 carbon atoms; n is 1–6; Z and Z^1 are individually —NHR^1 or —COOH when monovalent and —NH— or —NR^1 when divalent; Z^2 is —NHR^1 or —COOH; R^1 is alkyl of 4–18 carbon atoms, alkenyl of 4–18 carbon atoms or —$(CH_2)_q$— COOH where q is 1–4; m is an integer of 0–6 and Z^1 is not present when m is 0; and p is an integer of 0–6 and Z^2 is not present when p is 0; said amine or amino acid having at least 8 carbon atoms; and

b. a cupric salt of a non-toxic acid; wherein the amount of amine is such that there are 0.1–10 aminic nitrogen atoms per Cu atom and wherein at least a part of the copper being combined with the amine in the form of a complex.

4,048,325

LOW TOXICITY METHOD OF INHIBITING SICKLING OF SICKLE ERYTHROCYTES

Lester Packer, Orinda, and Edwin N. Bymun, Oakland, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 5, 1976, Ser. No. 646,707
Int. Cl.² A01N *1/02;* A61K *31/21;* G01N *1/30*
U.S. Cl. 424—298 9 Claims

1. A method of inhibiting sickling of human sickle erythrocytes which comprises intermixing the erythrocytes with a water-soluble monofunctional imidoester having the general formula RC(=NH)OR′ wherein R is an alkyl group of 1–8 carbon atoms and R′ is an alkyl group of 1–4 carbon atoms in a amount effective to inhibit sickling and below the toxicity level of the imidoester.

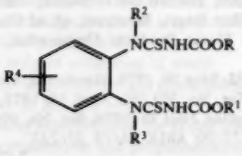
4,048,326

TREATMENT OF HELMINTH INFECTIONS WITH SUBSTITUTED 1,2-BIS(THIOUREIDO)BENZENE

Samuel Sidney Berg, Ilford; David Conwil Jenkins, Gidea Park, and Ronald Frederick Phillipson, Brentwood, all of England, assignors to May & Baker Limited, England

Filed June 15, 1971, Ser. No. 153,409
Claims priority, application United Kingdom, June 16, 1970, 29529/70; June 22, 1970, 30244/70; Sept. 4, 1970, 42609/70; Mar. 31, 1971, 8292/71; France, June 11, 1971, 71.21293
Int. Cl.² A61K *31/27*
U.S. Cl. 424—300 15 Claims

1. A method for the treatment of helminth infections in man and domestic animals which comprises administering to man or a domestic animal infected with helminths an anthelmintically effective amount of at least one benzene derivative of the formula;



wherein R and R^1 each represent an aliphatic hydrocarbon

group of 1 to 4 carbon atoms which is unsubstituted or substituted by halogen or alkoxy of 1 to 4 carbon atoms, R^2 and R^3 each represent hydrogen or methyl, and R^4 represents hydrogen, halogen, alkyl of 1 to 4 carbon atoms, alkanoylamino of 1 to 4 carbon atoms which is unsubstituted or substituted by cycloalkyl of 3 to 6 carbon atoms, alkoxycarbonylamino of 2 to 4 carbon atoms, alkanoyl of 2 to 4 carbon atoms, benzoyl or N-methylmethanesulphonylamino.

4,048,327

(4-PHENOXYPHENOXY)ALKYL CYCLOPROPANECARBOXYLATES

Friedrich Karrer, Zofingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

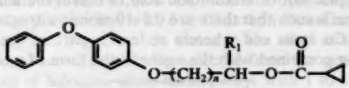
Filed July 20, 1976, Ser. No. 707,150

Claims priority, application Switzerland, July 25, 1975, 9734/75; June 17, 1976, 7744/76

Int. Cl.[2] C07C *61/04;* A01N *9/28*

U.S. Cl. 424—305 **13 Claims**

1. A cyclopropanecarboxylate of the formula I



(I)

wherein

R_1 represents hydrogen, methyl or ethyl and

n is 1, 2 or 3.

4,048,328

ALKYL DERIVATIVES OF 4,5-DEHYDRO PGF_1

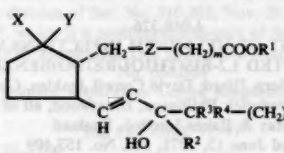
Nedumparambil A. Abraham, Dollard des Ormeaux; Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 578,593, May 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 351,381, April 16, 1973, Pat. No. 3,917,668. This application June 15, 1976, Ser. No. 696,453

Int. Cl.[2] 560 *121;* C07C *177/00;* A61K *31/19, 31/215*

U.S. Cl. 424—305 **10 Claims**

1. A compound of formula



in which *m* is an integer from 0 to 2 *n* is an integer from 2 to 5 X represents hydroxy and *Y* is hydrogen, Z represents the radical cis—CH_2—CH=CH—,R^1 is hydrogen or lower alkyl and R^2, R^3 and R^4 each are hydrogen or lower alkyl with the provisos that at least one of R^2, R^3 or R^4 is lower alkyl and at least one of R^2, R^3 or R^4 is hydrogen.

4,048,329

ALKYL DERIVATIVES OF 4,5-DEHYDRO PGE_1

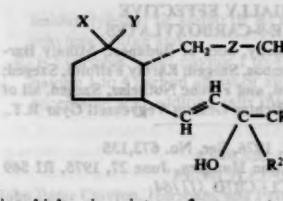
Nedumparambil A. Abraham, Dollard des Ormeaux; Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 578,593, May 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 351,381, April 16, 1973, Pat. No. 3,917,668. This application June 15, 1976, Ser. No. 696,328

Int. Cl.[2] C07C *177/00;* A61K *31/19, 31/215*

U.S. Cl. 424—305 **7 Claims**

1. A compound of formula



in which m is an integer from zero to two, n is an integer from two to five, X and Y together represent oxo, Z represents the radical cis-CH_2—CH=CH—, R^1 is hydrogen or lower alkyl and R^2, R^3 and R^4 each are hydrogen or lower alkyl with the provisos that at least one of R^2, R^3 or R^4 is lower alkyl and at least one of R^2, R^3 or R^4 is hydrogen.

4,048,330

COMPOSITIONS CONTAINING 2-(6′-SUBSTITUTED-2′-NAPHTHYL)ACETIC ACID ESTERS USED FOR TREATING INFLAMMATION, PAIN OR PYREXIA

John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Palo Alto, Calif.

Continuation of Ser. No. 394,751, Sept. 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 195,869, Nov. 4, 1971, abandoned, and Ser. No. 195,877, Nov. 4, 1971, abandoned, and Ser. No. 195,878, Nov. 4, 1971, and Ser. No. 372,028, June 21, 1973, said Ser. No. 195,869, is a division of Ser. No. 810,014, March 24, 1969, abandoned, said Ser. No. 195,877, is a division of Ser. No. 810,013, March 24, 1969, abandoned, said Ser. No. 195,878, is a division of Ser. No. 694,771, Dec. 7, 1967, abandoned, said Ser. No. 372,028, is a continuation of Ser. No. 176,740, Aug. 31, 1971, abandoned, which is a continuation-in-part of Ser. No. 694,771, Ser. No. 810,013, and Ser. No. 810,014, said Ser. No. 694,771, is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned, said Ser. No. 810,013, and Ser. No. 810,014, each is a continuation-in-part of Ser. No. 608,997, and Ser. No. 694,771,. This application Aug. 18, 1975, Ser. No. 605,477

The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.

Int. Cl.[2] A61K *31/235*

U.S. Cl. 424—308 **4 Claims**

1. A composition for treating inflammation, pain or pyrexia in mammals comprising a pharmaceutically acceptacle non-toxic excipient and a therapeutically effective amount of the isopentyl ester of d 2-(6′-methoxy-2′-naphthyl)propionic acid.

4,048,331

PROCESS OF TREATMENT

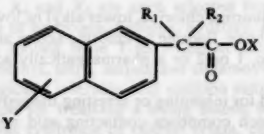
Neel C. Sekhar, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 514,839, Oct. 15, 1974, which is a continuation-in-part of Ser. No. 370,990, June 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,714, July 31, 1972, abandoned. This application Nov. 10, 1975, Ser. No. 630,139

Int. Cl.[2] A61K *31/19*

U.S. Cl. 424—317 **3 Claims**

1. A process for reducing platelet adhesiveness comprising the administration of an effective amount for reducing platelet adhesiveness of a compound of the formula:



wherein Y is lower alkyl of 1 to 8 carbon atoms, cyclopropyl, ethinyl, $-CF_3$, $-F$, $-Cl$, $-OCH_3$, $-OCH_2OCH_3$, $-SCH_3$, $-SCHF_2$, $-SCH_2OCH_3$, acetyl; R_1 and R_2 are H, CH_3, CHF_2, or taken together are $=CH_2$ or $=CF_2$; and X is hydrogen, or a pharmacologically acceptable cation, to a human or animal having elevated platelet adhesiveness.

4,048,332

PHENYLALKANOIC ACIDS

Stewart S. Adams; Bernard J. Armitage, and John S. Nicholson, all of Nottingham, England, assignors to The Boots Company Limited, Nottingham, England

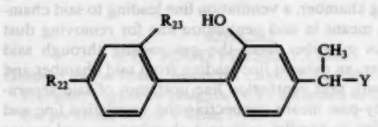
Continuation-in-part of Ser. No. 367,614, June 6, 1973, Pat. No. 3,969,402. This application Feb. 9, 1976, Ser. No. 656,220

Int. Cl.[2] A61K *31/05, 31/19, 31/42, 31/165*

U.S. Cl. 424—317 **23 Claims**

1. A therapeutic composition useful in the treatment of pain, inflammation or pyretic conditions or in preventing or inhibiting aggregation of blood platelets which comprises, as active ingredients, a compound of formula I

I



wherein R_{22} and R_{23} are selected from hydrogen and halogen and Y is COOH,

or a pharmaceutically acceptable ester or a salt of a compound wherein Y is COOH and a pharmaceutically acceptable carrier.

4,048,333

METHOD FOR TREATING A PICORNA VIRUS INFECTION

Angel Simeonov Galabov; Lubomir Mihaylov Shindarov; Georgi Nikolov Vassilev; Ragka Taneva Vassileva; Zlatka Petkova Dimcheva; Dushka Staneva Stoycheva, and Emilia Hristova Velichkova, all of Sofia, Bulgaria, assignors to Medizinska Akademia, Sofia, Bulgaria

Continuation of Ser. No. 282,918, Aug. 23, 1972, abandoned. This application June 10, 1975, Ser. No. 585,517

Claims priority, application Bulgaria, Aug. 23, 1971, 17294

Int. Cl.[2] A61K *31/17, 31/44, 31/34, 31/27*

U.S. Cl. 424—322 **1 Claim**

1. A method of treating a picorna virus infection which comprises orally administering to a patient an anti-picorna virus effective amount of N-phenyl-N-4-hydroxy-phenylthiourea or N-phenyl-N-3-hydroxy-phenylthiourea.

4,048,334

ACTIVE DERIVATIVES OF METHYLAMINO IN THERAPEUTIC COMPOSITIONS AND METHODS OF USE

Charles Pigerol, Saint-Ouen; Pierre Eymard, Fontaine; Jean-Claude Vernieres, La Tronche, and Jean-Pierre Werbenec, Seyssinet, all of France, assignors to Labaz, Paris, France

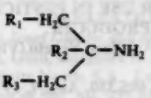
Division of Ser. No. 577,732, May 15, 1975. This application Aug. 22, 1975, Ser. No. 606,880

Claims priority, application Belgium, May 20, 1974, 144519

Int. Cl.[2] A61K *31/13*

U.S. Cl. 424—325 **6 Claims**

1. Method of treating Parkinson's disease and correcting extra-pyramidal disturbances provoked by neuroleptics comprising the administration to a subject in need of such treatment of an effective dose of at least one methylamine derivative of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which R_1 represents ethyl, R_3 represents methyl or ethyl, and R_2 represents

a. ethyl, n-propyl, isopropyl, isobutyl, tert-butyl, or 1-butenyl when R_3 is ethyl, or

b. n-butyl or isobutyl when R_3 is methyl.

4,048,335

METHOD OF INHIBITING MYOCARDIAL ISCHEMIA IN MAMMALS USING QUATERNARY SALTS

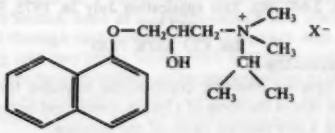
Benedict R. Lucchesi, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.

Division of Ser. No. 480,114, June 17, 1974, Pat. No. 4,001,327, which is a continuation-in-part of Ser. No. 269,128, July 5, 1972, Pat. No. 3,840,666. This application Aug. 19, 1976, Ser. No. 715,961

Int. Cl.[2] A61K *31/14, 31/685*

U.S. Cl. 424—329 **4 Claims**

1. A method of inhibiting myocardial ischemia in mammals which comprises administering to mammals requiring inhibition of myocardial ischemia a therapeutically effective amount of a compound of the formula



wherein X^- is the anion of pharmaceutically acceptable nontoxic acid.

4,048,336

MEANS FOR KILLING BACTERIAL SPORES WITH GLUTARALDEHYDE SPORICIDAL COMPOSITIONS

Murray A. Winicov, Flushing, N.Y., and Abraham Cantor, Elkins Park, Pa., assignors to West Chemical Products, Incorporated, Long Island City, N.Y.

Continuation of Ser. No. 463,200, April 22, 1974, abandoned, which is a division of Ser. No. 157,681, June 28, 1971, abandoned. This application Apr. 23, 1975, Ser. No. 570,638

Int. Cl.[2] A01N *9/24*

U.S. Cl. 424—334 **17 Claims**

1. A process for killing bacterial spores on instruments, appliances, eating utensils, walls, floors, and beds which comprises treating same with a sporicidally effective amount of a sporicidal composition comprising:

a. a solvent consisting of water

b. 0.5 to 6% by weight glutaraldehyde, and

c. 0.5 to 10% by weight monoaldehyde, said monoaldehyde being selected from the group consisting of formaldehyde, acetaldehyde and propionaldehyde,

and said composition being further characterized as having a pH no less than 6.5 and no greater than 7.4.

4,048,337

GYPSUM DUST DILUENTS FOR USE IN PESTICIDES AND FERTILIZING PRODUCTS

Bruno Fabbian, Via XI Febbraio, 27 Asigliano Veneto (Vicenza), Italy

Continuation-in-part of Ser. No. 495,330, Aug. 7, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,573
Claims priority, application Italy, Aug. 24, 1973, 85592/73
Int. Cl.² A01N 9/00
U.S. Cl. 424—357 3 Claims

3. A diluent or carrier for incorporation in pesticidal compositions containing a pesticidally active ingredient prepared by baking a calcium sulfate mineral at a temperature between 120°–1000° C to produce baked chalk, alpha chalk, beta chalk, gamma chalk or hydraulic chalk, adding water in amount between 15 and 70% of the weight of said baked calcium sulfate to form a dispersion, allowing settling to occur, adding 0.001–10% by weight of an additive, in an amount which is effective to reduce the rate of decomposition of the pesticidally active ingredient, said additive being a double sulfate of aluminum and potassium, a non-ionic, anionic or cationic surface active agent, carboxymethylcellullose, urea, a glycol, hexamethylene-tetramine, sodium bisulfate dihydrate, polyvinyl acetate, polyvinyl chloride or monobasic calcium phosphate, converting the material thus obtained to granular or powdery form and drying at 30°–300° C.

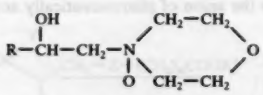
4,048,338

AQUEOUS COSMETIC COMPOSITION CONTAINING AMINE OXIDES

John Fred Gerecht, Somerville, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 414,586, Nov. 9, 1973, Pat. No. 3,926,861, which is a division of Ser. No. 166,253, July 26, 1971, Pat. No. 3,809,659, which is a division of Ser. No. 677,723, Oct. 24, 1967, Pat. No. 3,637,682. This application July 24, 1975, Ser. No. 613,370
Int. Cl.² A61K 7/50
U.S. Cl. 424—358 7 Claims

1. An aqueous cosmetic composition intended for application to the skin in the form of a lotion, cream, gel or clear liquid containing a morpholine oxide of the formula



wherein R is alkyl of 6 to 20 carbon atoms.

4,048,339

PREPARATION OF CHEESE WITH A MICROBIAL MILK COAGULATING ENZYME

Maria Stefanova Kondratenko; Lyubomir Todorov Nachev; Petrushka Atanassova Dedova, and Tamara Nikolaevna Antonova, all of Sofia, Bulgaria, assignors to DSO "Mlechna Promishlenost", Sofia, Bulgaria

Filed Nov. 20, 1975, Ser. No. 633,697
Claims priority, application Bulgaria, Nov. 22, 1974, 28256
Int. Cl.² A23C 19/00; C07G 7/02
U.S. Cl. 426—39 1 Claim

1. In a process for preparing hard and soft cheese from cow milk comprising the steps of:

1. mechanically cleaning of supply of cow milk;
2. cooling said milk;
3. pasteurizing the milk;
4. again cooling the milk;
5. adding a starter comprising lactic acid microorganisms to the milk;
6. adding the equivalent of 0.025 to 0.030% by volume based on the milk a solution of 50% calcium chloride to the milk;
7. adding liquid rennet to the milk to produce coagulation;
8. and processing the cheese product; the improvement which comprises:
   1. increasing the acidity of the milk before pasteurization to about 21°–24° T (0.189 to 0.216%) lactic acid;
   2. increasiing the said equivalent amount of calcium chloride described in step 6 added to the milk by 2 to 4 fold;
   3. adding sufficient of the enzyme obtained from *Bacillus subtilis mesentericus* to produce coagulation within 25–40 minutes.

4,048,340

KOJI MAKING METHOD

Masahiko Izumi, 8,26-ban, 5-chome, Hiikawa, Nish, Fukuoka, Japan

Filed July 6, 1976, Ser. No. 702,605
Claims priority, application Japan, July 21, 1975, 50-088408; July 23, 1975, 50-089176; Feb. 27, 1976, 51-020084; Mar. 26, 1976, 51-032493; May 6, 1976, 51-050944
Int. Cl.² A23L 1/23, 1/34
U.S. Cl. 426—46 7 Claims

7. A process for making Koji using an apparatus comprising a Koji making chamber, a ventilation line leading to said chamber, removal means in said ventilation line for removing dust and infectious microbes from the gas passing through said ventilation line, an exhaust line leading from said chamber and connecting with said ventilation line upstream of said separation means, by-pass means connecting the ventilation line and the exhaust line in parallel with said chamber, control means for controlling the amount of ventilation gas passing through said by-pass means, means for adding ventilation gas, means for venting ventilation gas, means for adding oxygen containing gas, means for adding heated aqueous vapor to the ventilation gas, and means for circulating the ventilation gas through the system, comprising:

adding Koji making starting materials to said chamber;

causing ventilation gas which is an inert as substantially free of oxygen to circulate through the system, adding sufficient heated aqueous vapor to heat the ventilation gas for avoidance of infectious microbes and maintain the temperature thereof at 32–38° C, and controlling said control means to maintain the germination temperature, humidity and flow rate in said chamber, until germination of the Koji-mould; and

after germination of the Koji-mould continuing said steps of causing circulation and adding heated aqueous vapor, adding sufficient oxygen containing gas to said ventilation gas to maintain an oxygen concentration necessary for growth in the system and controlling said control means to maintain the growth temperature, humidity and flow rate in said chamber, until the Koji is completed.

4,048,341

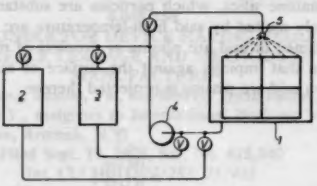
PROCESS AND AN APPARATUS FOR INCREASING THE FEED VALUE OF LIGNOCELLULOSIC MATERIALS

Gösta Bertil Lagerström, Glumslov, and Olof Arthur Mattsson, Viken, both of Sweden, assignors to Boliden AB, Stockholm, Sweden

Filed July 7, 1975, Ser. No. 593,662
Claims priority, application Sweden, July 8, 1974, 7408979
Int. Cl.² A23K 1/00, 3/00
U.S. Cl. 426—69 12 Claims

1. Process for increasing the feed value of lignocellulosic materials which comprises contacting lignocellulosic material with an alkaline liquid, wherein the alkaline liquid is supplied in excess and the excess is allowed to run off the lignocellulosic material before any substantial alkalization effect has been reached and wherein the excess alkali that is allowed to run off may be used for the treatment of a new quantity of said material, and that, after the alkaline liquid absorbed in the lignocellulosic material has provided its alkalization effect for a time necessary to partially break down the lignin or create openings

in the lignin and expose the cellulose for celluose-degrading enzymes in the rumen of a ruminant animal, an acid solution or nutritive solution is added to the treated material for neutralization, said solution being supplied in such an amount as to at least correspond to the residual absorption capacity of the lignocellulosic material resulting from the effect of the alkaline liquid absorbed by the material.



4,048,342

PET FOOD PRESERVATION

Gerhard Julius Haas, Woodcliff Lake, N.J., and Edwin Bernard Herman, Yorktown Heights, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,206
Int. Cl.[2] A23B *4/12*
U.S. Cl. 426—129 10 Claims

1. In a method for preparing an intermediate-moisture food comprising pasteurized meat and containing an antimicrobial agent selected from the group of linear aliphatic acids, their edible salts, and combinations thereof, the improvement comprising:

packaging said food in a substantially gas impervious packaging material, and filling the free space in the package with carbon dioxide,

said food containing a level of said antimicrobial agent which is ineffective in the absence of the carbon dioxide to prevent microbial growth, but effective to prevent microbial growth when the food is packaged in carbon dioxide.

4,048,343

METHOXYMETHANE STERILIZATION METHOD

Irving E. Levine, Mill Valley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 504,130, Sept. 9, 1974, abandoned, which is a division of Ser. No. 387,869, Aug. 13, 1973, abandoned, which is a division of Ser. No. 337,519, March 2, 1973, Pat. No. 3,795,750, which is a continuation-in-part of Ser. No. 65,695, Aug. 20, 1970, abandoned, and Ser. No. 238,601, March 27, 1972, abandoned, said Ser. No. 236,601, is a continuation-in-part of Ser. No. 163,532, July 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 65,695,. This application Feb. 11, 1976, Ser. No. 657,119
The portion of the term of this patent subsequent to Aug. 19, 1992, has been disclaimed.
Int. Cl.[2] A23C *3/00*; A23L *3/00*
U.S. Cl. 426—330.2 5 Claims

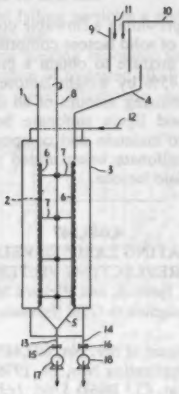
1. Sterilization or preservation method comprising physically contacting substances of the class consisting of solid foods and beverages contaminated by microorganisms with an effective amount of methoxymethane under pressure and temperature sufficient to maintain the methoxymethane in liquid state and for a contact time with said microorganisms sufficient to effectively control the microorganisms, releasing the pressure and removing methoxymethane by evaporation.

4,048,344

PREPARATION OF TEA EXTRACTS

Rupert Josef Gasser, and Steven N. Watercutter, both of Marysville, Ohio, assignors to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland

Division of Ser. No. 421,852, Dec. 5, 1973, Pat. No. 3,992,983. This application June 26, 1975, Ser. No. 590,466
Int. Cl.[2] A23F *3/00*
U.S. Cl. 426—385 25 Claims



1. A process for continuously preparing a tea extract which comprises continuously feeding an aqueous tea slurry at a temperature of at least about 90° C through a first zone at a predetermined rate while continuously feeding an aqueous extraction liquid at a temperature of at least about 90° C through a second zone at a predetermined rate concurrently with feed through said first zone and in contact with a barrier separating said two zones, said barrier being permeable to tea soluble solids flow therethrough but impermeable to tea insolubles flow therethrough to permit diffusion of tea solubles from the aqueous tea slurry into the aqueous extraction liquid, the volume of the slurry being about 0.5 to 2.5 times the volume of the aqueous extraction liquid, continuously removing aqueous slurry and extraction liquid from the respective two zones, the extraction liquid being removed from the second zone at a greater rate than at which it is supplied thereto, the aqueous slurry being removed from the first zone at a lesser rate than that at which it is supplied thereto with the aqueous slurry having a residence time in said first zone of at least about 2 minutes, and thereafter combining at least a part of the tea solubles diffused into the extraction liquid with tea solubles remaining in the aqueous slurry.

4,048,345

COFFEE PERCOLATION PROCESS

Saul Norman Katz, Monsey, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 417,312, Nov. 19, 1973, abandoned. This application Feb. 2, 1976, Ser. No. 654,447
Int. Cl.[2] A23F *1/08*
U.S. Cl. 426—432 2 Claims

1. In a percolation process wherein roasted and ground coffee is loaded into a series of fixed volume extraction columns in a manner such that said roasted and ground coffee exhibits packed bed characteristics and is concurrently contacted with an aqueous extraction liquid, the improvement whereby uniform quality and operating characteristics are obtained at reduced output rates, said improvement comprising loading spent coffee grounds and roast ground coffee into said extraction columns to obtain a packed bed such that said aqueous extraction liquid entering said columns contacts said spent grounds prior to contacting the roasted and ground

coffee to be extracted whereby said packed bed characteristics are maintained throughout the extraction process.

4,048,346

METHOD OF STABILIZING LACTOSE COMPOSITIONS

Jerry H. Stoller, Houston, Tex., assignor to Stoller Chemical Company, Inc., Houston, Tex.

Filed Nov. 17, 1975, Ser. No. 632,236
Int. Cl.² A23C *21/00*
U.S. Cl. 426—583 **20 Claims**

1. A method of providing a flowable composition having a high concentration of solid lactose comprising concentrating a lactose containing mixture to obtain a product having from about 20 to about 45% by weight lactose and admixing said product with a stabilizing amount of an ingestible, non-toxic lignin sulfonate, said lignin sulfonate being present in an amount sufficient to maintain said composition in a flowable form, said lignin sulfonate being added prior to substantial crystal growth of said lactose.

4,048,347

METHOD OF COATING LAMP ENVELOPE WITH HEAT REFLECTING FILTER

Martin P. Schrank, Ipswich, and Richard M. Coppola, Beverly, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Continuation-in-part of Ser. No. 603,415, Aug. 11, 1975, abandoned. This application Nov. 24, 1976, Ser. No. 744,556
Int. Cl.² B05D *5/06, 1/36*
U.S. Cl. 427—10 **2 Claims**

1. The method of depositing a dichroic coating on the tubular envelope of an incandescent lamp comprising the steps of disposing said envelope in an evacuable bell jar and in line of sight with an evaposating source therein; evacuating said bell jar; heating and rotating said envelope while two different materials are alternately evaporated and deposited on the envelope, the envelope being heated during deposition to a temperature of at least about 300° C by energizing the lamp filament; and monitoring the thickness of said coating by beaming light on a plate located in the bell jar in line of sight with the evaporating source, recording the intensity of light reflected from said plate, determining the thickness of coating on said plate by means of said intensity of reflected light and multiplying said thickness of coating on said plate by a predetermined ratio to determine the coating thickness on said envelope.

4,048,348

METHOD OF APPLYING A FUSED SILICA COATING TO A SUBSTRATE

Cecil Bailey, Woodlyn; Walter C. Balchunas, Linfield, both of Pa., and John E. Zlupko, Delran, N.J., assignors to General Electric Company, Philadelphia, Pa.

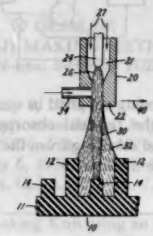
Continuation of Ser. No. 190,190, Oct. 18, 1971, Pat. No. 3,814,620. This application Nov. 7, 1973, Ser. No. 413,489
The portion of the term of this patent subsequent to June 4, 1991, has been disclaimed.
Int. Cl.² B05D *3/06*
U.S. Cl. 427—34 **2 Claims**

1. A method of applying to a substrate of refractory nonmetallic material a coating consisting essentially of fused silica that is firmly bonded to said substrate, said substrate comprising a base with elongated fins projecting therefrom, the method comprising the steps of:

a. providing an arc plasma spray gun that comprises an arc chamber in which an electric arc is established, means for feeding gas into the arcing chamber to develop a high temperature arc plasma, a nozzle through which said arc plasma is exhausted from said gun, and means through which particles of coating material can be fed into said arc plasma to melt the particles and entrain them in the arc plasma exhausted from said gun,

b. developing high-temperature arc plasma within said gun and projecting said arc plasma from the gun onto a surface of said refractory non-metallic substrate material,

c. feeding into said arc plasma a powder consisting essentially of particles of a material consisting essentially of crystalline silica, which particles are substantially completely melted by said high-temperature arc plasma and entrained in said arc plasma as droplets of molten fused silica that impinge against the surface of said substrate when said arc plasma is projected thereon,



d. holding said nozzle close enough to said substrate during the times that arc plasma containing said molten fused silica droplets is being projected thereon to effect melting of the substrate surface that said molten silica droplets are impinging against, and

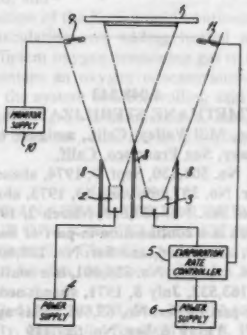
e. moving said arc plasma spray gun generally perpendicular to the length of said fins during the arc plasma spraying step of (c) and (d).

4,048,349

COMPOSITE METAL POLYMER FILMS

Martin White, Hassocks, and Niyom Boonthanoom, Brighton, both of England, assignors to National Research Development Corporation, London, England

Filed Dec. 5, 1974, Ser. No. 530,018
Claims priority, application United Kingdom, Dec. 7, 1973, 56788/73
Int. Cl.² B05D *5/12*; C23C *11/00*
U.S. Cl. 427—58 **17 Claims**



1. A process for producing a composite metal polymer film having a negative temperature coefficient of resistance, comprising

co-depositing, by evaporation from separate sources in a vacuum, metalliferous particles and insulative polymer particles onto a substrate, the proportion of metalliferous particles being such that the metal in the film is discontinuous, the metal particles being present in the form of islands with intervening zones of polymeric material, the islands having diameters of from 110A to 1000A, and

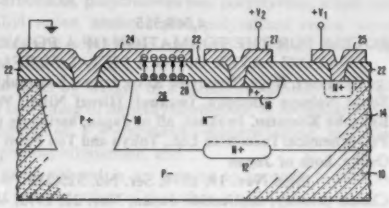
subjecting the film in an oxidizing atmosphere at from 200°

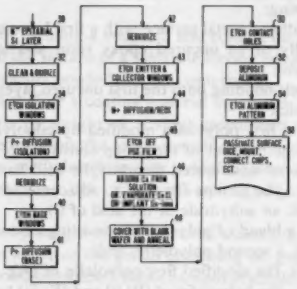
to 220° C to an oxidative treatment in which substantial oxidation of the separate metal islands is achieved before loss of the polymer by oxidation and/or evaporation.

4,048,350
SEMICONDUCTOR DEVICE HAVING REDUCED SURFACE LEAKAGE AND METHODS OF MANUFACTURE

Reinhard Glang, Reston, Va., and Stanley Irwin Raider, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 19, 1975, Ser. No. 615,040
Int. Cl.² H01L *21/283, 21/461*
U.S. Cl. 427—93 **9 Claims**





1. A process for fabricating a semiconductor comprising steps of

a. forming an insulating layer on a semiconductor substrate,
b. forming a layer of positive ions on the surface of the insulating layer,
c. covering the insulating layer with a blank wafer to prevent gaseous escape of the positive ions from the insulating layer, and
d. driving the positive ions toward the substrate/insulating layer interface to achieve a positive charge level exceeding 2×10^{11} ions/cm² to prevent the formation of surface leakage paths on the substrate by potentials across the insulating layer exceeding 10 volts.

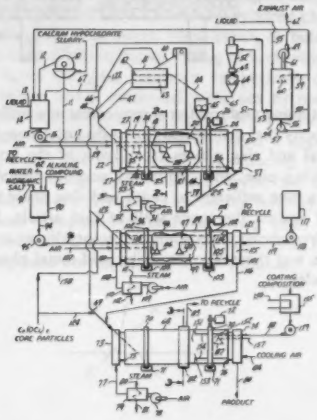
4,048,351
GRANULAR CALCIUM HYPOCHLORITE COATED WITH A LOW MELTING INORGANIC SALT BY SPRAY GRAINING

Walter C. Saeman, Hamden, Conn., and Noel N. Coe, West Lake, La., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 521,417, Nov. 6, 1974, which is a continuation-in-part of Ser. No. 276,615, July 31, 1972, abandoned. This application Mar. 12, 1975, Ser. No. 557,715
Int. Cl.² B05D *7/00*
U.S. Cl. 427—213 **16 Claims**

1. A method for preparing coated particulate solid calcium hypochlorite from a pumpable and sprayable molten hydrated low melting inorganic salt which comprises:

a. maintaining a moving bed of particulate solid calcium hypochlorite core particles containing from about 50 to about 85 percent available chlorine on a dry basis and from about 0.5 to about 30 percent by weight of water in the lower part of a distributing zone having an upper part and a lower part,
b. maintaining a temperature in said distribution zone in the range from about 0 to about 40° C.,
c. lifting a portion of said moving bed to said upper part and releasing said particles to separately fall through said distributing zone to said bed
d. spraying on said falling particles a melt of hydrated low melting inorganic salt,
e. wherein said low melting inorganic salt is selected from the group consisting of hydrated alkali metal metaborate, hydrated alkali metal tetraborate, hydrated aluminum



sulfate, hydrated magnesium sulfate, eutectic mixtures of alkali metal metaborate and hydrated alkali metal tetraborate, and mixtures thereof,
f. simultaneously cooling and solidifying said melt on the surface of said falling particles whereby said particles are coated with at least one outer layer of said low melting inorganic salt,
g. removing at least a portion of the resulting coated rounded solid calcium hypochlorite particles from said distributing zone,
h. wherein said exterior coating ranges from about 4 to about 45 percent by weight of said particles, and
i. wherein said calcium hypochlorite core particles are prepared by spray graining of a calcium hypochlorite slurry in a distribution zone prior to coating with said hydrated low melting inorganic salt.

4,048,352
METHOD OF PRODUCING A REFRACTORY LINING IN A CYLINDER OR TUBE

Arthur J. Pignocco, Franklin Township, Westmoreland County, and Robert H. Kachik, Washington Township, Westmoreland County, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

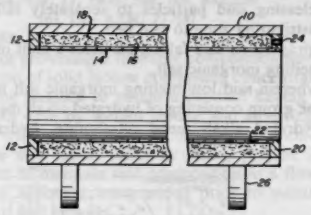
Continuation-in-part of Ser. No. 332,972, Feb. 15, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 549,630
Int. Cl.² B05D *7/22, 3/02*
U.S. Cl. 427—234 **1 Claim**

1. A method of producing an abrasion-resistant refractory lining in a cylindrical hollow metal article having an inner surface area to be lined, comprising:

a. introducing into said metal article a predetermined quantity of an exothermic reaction mixture comprising a powdered fuel metal and a reducible metallic oxide powder, said powdered fuel metal being selected from the group

consisting of aluminum, magnesium, silicon, calcium-silicon alloy and mixtures thereof;

b. igniting said reaction mixture to form a reaction mass comprising a heavier, molten reduced metal phase and a lighter, molten slag phase, and subjecting said cylindrical article to a rotational movement about its longitudinal axis;



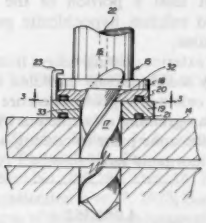
c. continuing said rotational movement at a sufficiently slow velocity that centrifugal forces do not prevent the molten metal and slag phases from lying at the bottom of the rotating pipe, and continuing said rotational movement for a time sufficient to cause said slag phase to be deposited against the inner wall of said article, forming the desired abrasion-resistant, refractory lining over said surface, and thereafter removing said metal phase from said article.

4,048,353

METHOD OF DRILLING AND INJECTING PERSERVATIVE FLUID INTO RAILWAY TIES

John Kenneth Stewart, and Helmuth von Beckmann, both of Columbia, S.C., assignors to Canron, Inc., New York, N.Y.

Filed Mar. 18, 1976, Ser. No. 667,993
Int. Cl.[2] B23B *35/00*; B27K *3/02*
U.S. Cl. 427—291 **1 Claim**



1. A method of drilling and injecting preservative fluid into a railway tie, the method comprising the steps of initially drilling a hole in the tie with a suitable fluted drill of the kind incorporating an internal, longitudinal fluid flow passage opening adjacent the drill tip, by rotating the drill in the drilling direction and simultaneously axially feeding the drill into the drilled hole, reversing the direction of drill rotation and simultaneously withdrawing the drill to clear the drilled hole of shavings, returning the drill to the hole using drilling rotation, reversing the drill rotation and maintaining the drill fully in the hole, while injecting preservative fluid into the walls of the hole from said opening, sealing the mouth of the hole to prevent the egress of preservative therefrom, and subsequently withdrawing the drill from the hole.

4,048,354

METHOD OF PREPARATION AND USE OF NOVEL ELECTROLESS PLATING CATALYSTS

Nathan Feldstein, P.O. Box 2027, Princeton, N.J. 08540

Filed Oct. 23, 1975, Ser. No. 625,326
Int. Cl.[2] C23C *3/02*
U.S. Cl. 427—304 **34 Claims**

1. A method for forming an active catalyst useful in electroless plating processes comprising a metal capable of electroless plating initiation derived from the admixing of weakly active colloidal dispersion of said metal or a compound of said metal or alloy of said metal containing a stabilizer so as to render said dispersion stable with a reactivity modifier selected from the groups consisting of surfactants and soluble halides.

4,048,355

PROCESS FOR THE FORMATION OF A POLYOLEFIN COATING LAYER ONTO A METAL SURFACE

Seigo Sakayori, Koga; Tomoyosi Kuro, Izumi; Kazuyuki Morita, Sowa; Nobuya Hinooka, Iwakuni; Hirozi Niimi, Waki, and Kensuke Komatsu, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo and Toa Paint Co. Ltd., Osaka, both of Japan

Filed Nov. 19, 1974, Ser. No. 525,219
Claims priority, application Japan, Nov. 22, 1973, 48-131972
Int. Cl.[2] B05D *1/36*
U.S. Cl. 427—375 **19 Claims**

1. A process for coating a metal surface with a polyolefin comprising:

I. coating a metal surface with a first layer consisting essentially of an uncured epoxy resin and least one curing agent; and

II. melt-bonding onto the first uncured layer, a second layer which is:

A. a first polyolefin modified by copolymerization with one member of the group consisting of:

i. an unsaturated dicarboxylic acid having the carboxylic groups attached to adjacent carbon atoms,

ii. an anhydride of the acid of (i); or

B. a blend of polyolefins consisting essentially of:

i. a second polyolefin, and

ii. the modified first polyolefin of (A),

the polyolefin of (B) (i) and (B) (ii) being the same or different,

with the provisos that: (1) for (A), the weight percentage of the repeating units of (A) (i) or (A) (ii) is from 10^{-4} to 10% of the modified polyolefin; and (2) for (B), the weight percentage of the repeating units of (B) (ii) is from 10^{-4} to 10% of the polyolefin blend.

4,048,356

HERMETIC TOPSEALANT COATING AND PROCESS FOR ITS FORMATION

Peter Bakos, Endicott; Irving Memis, Vestal, and John Rasile, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,511
Int. Cl.[2] B05D *3/02, 7/26*
U.S. Cl. 427—379 **13 Claims**

1. A process for forming a hermetic seal coating on electronic circuitry comprising applying to said circuitry a mixture which includes:

a. a vinyl unsaturated silane monomer

b. a bifunctional silane adhesion promoter

c. a polymeric plasticizer, and

d. an organic solvent

and curing said mixture to form a solid, adherent, cross-linked polysilane coating on said circuitry.

7. A process for forming a hermetic seal coating over electronic circuitry, which is supported on the surface of a substrate, comprising applying to said surface and circuitry a mixture which includes:

a. 0.5 to 10 parts by weight of a vinyl unsaturated silane monomer selected from the group consisting of, pentamethyldisiloxane methylmethacrylate, vinyltrichlorosilane, vinyltriethoxysilane and vinyltris(2-methoxyethoxy)silane;

b. 0.5 to 10 parts by weight of a bifunctional silane adhesion promoter selected from the group consisting of, gamma-aminopropyltriethoxysilane, beta-(3,4-epoxycyclohexyl)-ethyltrimethoxysilane, gamma-glycidoxypropyltrimethoxysilane, and N-beta(aminoethyl)-gamma-aminopropyl-trimethoxysilane;

c. 0.1–15 parts by weight of a polymeric plasticizer selected from the group consisting of, epoxy resins, polyesters, polycarbonates, polychloroprene, polystyrene, alkyd resins, allyl resins, amino resins, polysulfone resins, vinyl polymers and copolymers, urea and melamine resins and amide/imide polymers,

d. 0.0–80 parts by weight of a stabilizer selected from the group consisting of dimethylacetamide, N N-dimethylaniline, piperidine, 4',4'-dimethoxy-diphenylamine, and phenyl-alpha-naphthylamine, and

e. an organic solvent in an amount to provide 1–50% by weight concentration of the other ingredients,

and curing said mixture to form a solid, adherent, crosslinked polysilane coating having a thickness of from about 50 microinches to about 3 mils on said surface and circuitry.

12. A process for forming a hermetic seal coating on metal conductor lines on the surface of a substrate having integrated circuit chips electrically bonded thereto comprising:

applying to said surface a coating material comprises:

a. 0.5 to 10 parts by weight of, a vinyl unsaturated silane monomer selected from the group consisting of, pentamethyldisiloxane methylmethacrylate, vinyltrichlorosilane, vinyltriethoxysilane and vinyltris(2-methoxyethoxy)silane;

b. 0.5 to 10 parts by weight of a bifunctional silane adhesion promoter selected from the group consisting of, gamma-aminopropyltriethoxysilane, beta-(3,4-epoxycyclohexyl)-ethyltrimethoxysilane, gamma-glycidoxypropyltrimethoxysilane, and N-beta(aminoethyl)-gamma-aminopropyl-trimethoxysilane;

c. 0.1–15parts by weight of a polymeric plasticizer selected from the group consisting of, epoxy resins, polyesters, polycarbonates, polychloroprene, polystyrene, alkyd resins, allyl resins, amino resins, polysulfone resins, vinyl polymers and copolymers, urea and melamine resins and amide/imide polymers,

d. 0.0–80 parts by weight of a stabilizer selected from the group consisting of dimethylacetamide, N N-dimethylaniline, piperidine, 4',4'-dimethoxy-diphenylamine, and phenyl-alpha-naphthylamine, and

e. an organic solvent in an amount to provide 1–50% by weight concentration of the other ingredients,

said coating material being applied to a wet thickness less than the distance between the substrate surface and the bottom surface of the chip with the solid content of said coating material being adjusted to provide a dry coating thickness on said conductor lines of 400 to 500 microinches, and

curing said coating material by a three step heating cycle in which the mixture is first dried to a viscous state by heating at temperatures of from about 40° to 75° C, is next polymerized to a solid film by by heating at temperatures of from about 80° to 110° C and is finally cured to a dimensionally stable state by heating at temperatures of from about 115° to 180° C.

4,048,357

METHOD OF COATING MULTI-LAYER GRAPHIC FILM

August Jean Van Paesschen, Antwerpen, and Lucien Janbaptist Van Gossum, Kontich, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 404,675, Oct. 9, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 645,273

Claims priority, application United Kingdom, Oct. 10, 1972, 46727/72

Int. Cl.[2] B05D *3/00;* **G03C** *1/76*

U.S. Cl. 427—387 **6 Claims**

1. In a coating method for preparing a multi-layer material for use in the graphic arts or in X-ray photography in which a web of a polyester film support has applied to one of its sides to form an anchoring layer an aqueous binder latex containing at least one copolymer of vinyl chloride, vinylidene chloride, acrylic or methacrylic acid esters, vinyl esters, or butadiene, the anchoring layer is heated during drying or heat-setting to a temperature above the glass transition temperature of said copolymeric binder and is conveyed while hot by means of conveying rollers contacting said anchoring layer surface, and at least one gelatin-containing hydrophilic layer is applied to the anchoring layer, the improvement of reducing the tendency of said anchoring layer to adhere while hot to said conveying rollers or to a contiguous anchoring layer by incorporating a silane compound in said anchoring layer in the amount of about 5-100% by weight of said copolymer binder, said silane compound corresponding to the formula:

wherein:

each of R and R' represents hydrogen, alkyl, chloroalkyl, aminoalkyl, alkoxy, hydroxyalkoxy, aminoalkoxy, epoxyalkoxy, alkoxyalkoxy, acetyloxy, vinyl or phenyl, wherein alkyl contains 1 to 4 carbon atoms; and each of R'' and R''' represents cyanoalkyl, aminoalkyl, aminoalkoxyalkyl, epoxyalkoxyalkyl, alkoxycarbonylalkyl, (meth-)acryloyloxyalkyl, (meth)acrylaminoalkyl, chloroacetamidoalkyl, N-(aminoalkyl)-aminoalkyl, bis-(hydroxyalkyl)-aminoalkyl, alkoxy, hydroxyalkoxy, aminoalkoxy, epoxyalkoxy, alkoxyalkoxy, phenoxy, acetyloxy, and 3-[7-oxabicyclo-(4,1,0)-heptyl]-alkyl, wherein alkyl contains 1 to 4 carbon atoms

whereby the tendency of the anchoring layer of becoming tacky during drying of said layer or during transversal stretching, heat-setting or relaxation of the polyester film support to which said layer was applied is reduced and sticking of the anchoring layer to the conveyor rollers with which it is brought into contact before it is sufficiently cooled thus obviated without a corresponding reduction in the adhesion of the anchoring layer to said polyester support.

4,048,358

LIQUID CRYSTAL DEVICES

Ian Alexander Shanks, Malvern, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation of Ser. No. 636,786, Dec. 1, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,263

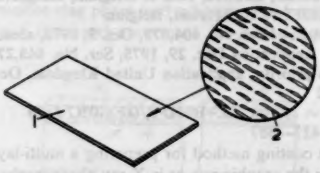
Claims priority, application United Kingdom, Dec. 2, 1974, 52123/74

Int. Cl.[2] C09K *3/34*

U.S. Cl. 428—1 **11 Claims**

1. A liquid crystal polarizer device comprising a sheet of

plastics material having an open elongated pore structure into which elongated pores a liquid crystal material has been introduced, the size of said pores being slightly larger than the molecular dimensions of said liquid crystal material.

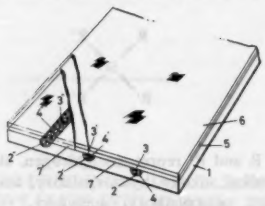


4,048,359

METHOD OF MANUFACTURING POLYCHROMATIC YARNS

Ichiro Shibanai, Tokyo, and Shoji Tanabe, Kamakura, both of Japan, assignors to Japan Jewel Company Limited, Tokyo, Japan

Filed Aug. 19, 1976, Ser. No. 715,738
Claims priority, application Japan, Sept. 23, 1975, 50-114319
Int. Cl.[2] B44F *1/00*
U.S. Cl. 428—1 **7 Claims**



1. Polychromatic artificial yarns each comprising a transparent plastic film enclosure incorporating (1) a layer of micro-encapsulated liquid crystals mixed with an ultraviolet light adsorbent in fine particle form and (2) a layer of carbon black, and manufactured by the steps of:

forming a plurality of grooves on one surface of a first transparent thin plastic film in parallel and spaced apart relationship with one another;

applying a layer of micro-encapsulated liquid crystals mixed with an ultra-violet light adsorbent onto the surface of each of said grooves;

applying a layer of carbon black over said surface of said first transparent thin plastic film;

covering adhesively said surface of said first transparent thin plastic film with a second transparent thin plastic film;

cutting out said second and first transparent thin plastic films longitudinally between said grooves into linear strips each forming the film enclosure.

2. In a method of manufacturing polychromatic artificial yarns each comprising a transparent plastic film enclosure incorporating therein (1) a layer of micro-encapsulated liquid crystals mixed with an ultra-violet light adsorbent in fine particle form and (2) a layer of carbon black, the improvement characterized by the steps of:

forming a plurality of grooves on one surface of a first transparent thin plastic film in parallel and spaced apart relationship with one another;

applying a layer of micro-encapsulated liquid crystals mixed with an ultra-violet light adsorbent onto the surface of each of said grooves;

applying a layer of carbon black over said surface of said first transparent thin plastic film;

covering adhesively said surface of said first transparent thin plastic film with a second thinner transparent plastic film;

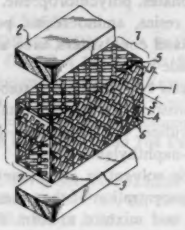
cutting out said second and first transparent plastic films longitudinally between said grooves into linear strips each forming the film enclosure.

4,048,360

LOW-WEIGHT DENT-RESISTANT STRUCTURE AND METHOD FOR PRODUCTION THEREOF

Wolfgang Jonda, Oberpframmern, Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Apr. 24, 1975, Ser. No. 571,491
Claims priority, application Germany, Apr. 25, 1974, 2419999
Int. Cl.[2] D02G *3/00*; B32B *5/12*
U.S. Cl. 428—35 **3 Claims**



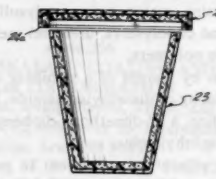
1. In a lightweight dent-resistant hollow structure of the type composed of two spaced apart outer sheets and an inner supporting core, the improvement which comprises said supporting core being composed of a series of rigid support sheets composed of resin-reinforced fibers in the form of a net, wherein at least one support sheet is parallel to and contiguous with each outer sheet and a plurality of said support sheets are disposed perpendicularly to and are secured to the parallel support sheets to maintain the outer sheets in said spaced apart position.

4,048,361

COMPOSITE MATERIAL

Emery I. Valyi, 5200 Sycamore Ave., Riverdale, N.Y. 10471

Continuation of Ser. No. 518,264, Oct. 29, 1974, abandoned.
This application July 30, 1976, Ser. No. 710,171
Int. Cl.[2] B65D *23/00, 23/02*
U.S. Cl. 428—35 **15 Claims**



1. A rigid composite container having improved resistance to unwanted gas permeation comprising a first barrier layer having substantial resistance to said gas permeation, a second carrier layer selected from the group consisting of plastic material and cellulosic material adjacent said first layer, the two layers being adhered one to the other substantially over their entire contacting areas, and a uniformly dispersed getter material capable of binding the unwanted gas in an amount sufficient to bind up any unwanted gas permeating the barrier layer, said getter material being carried by said carrier layer, wherein the barrier layer is in the position first exposed to the unwanted gas and is outermost with respect to said carrier layer, whereby the barrier layer provides initial and substantial but incomplete resistance to said gas permeation and gas pass-

ing through the barrier layer contacts dispersed getter material and is bound up thereby, said container having a hollow, bottle, jar or cup-like configuration and an open neck closed by a cover having resistance to said unwanted gas permeation.

4,048,362

REINFORCED ELASTOMERIC ARTICLES

Peter Lothar Ernst Moring, and Kenneth William John Raines, both of Sutton Coldfield, England, assignors to Dunlop Limited, London, England

Filed Apr. 19, 1976, Ser. No. 678,123

Claims priority, application United Kingdom, Apr. 25, 1975, 17175/75

Int. Cl.² B32B *27/34*; F16L *11/08*

U.S. Cl. 428—36 **23 Claims**

1. A method of bonding an aromatic polyamide which, if manufactured as a fibre, would be termed an aramid to a nitrile rubber composition comprises applying to the aromatic polyamide a coating of a vinyl chloride polymer, assembling the coated aromatic polyamide with the rubber composition and vulcanising the rubber in contact with the coated surface of said aromatic polyamide.

21. A composite article comprising a vulcanised nitrile rubber composition bonded to a vinyl chloride polymer coated surface of an aromatic polyamide which, if manufactured as a fiber, would be termed an aramid.

4,048,363

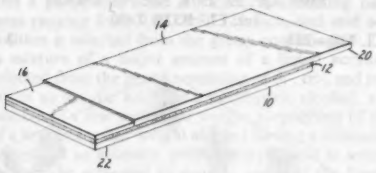
OFFSET LAMINATED INTUMESCENT MOUNTING MAT

Roger L. Langer, Troy Township, St. Croix County, Wis., and Alan J. Marlor, Minneapolis, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 16, 1976, Ser. No. 696,509

Int. Cl.² B32B *3/00*

U.S. Cl. 428—77 **3 Claims**



1. As an article of manufacture an intumescent conforming mounting pad comprised of at least a first ply of intumescent sheet material having one adhesive-coated face and having ends and edges separated by predetermined dimensions and a second ply of intumescent sheet material of substantially the same dimensions as said first ply longitudinally displaced from one end of said first ply by a predetermined amount and adhered to the adhesive-coated face of said first ply leaving a free end of said first ply with exposed adhesive-coated face.

4,048,364

POST-DRAWN, MELT-BLOWN WEBS

John W. Harding, and James P. Keller, both of Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

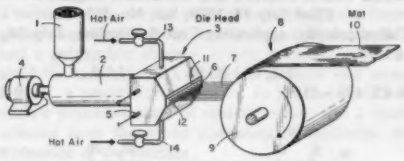
Continuation of Ser. No. 534,835, Dec. 20, 1974, abandoned, which is a continuation of Ser. No. 261,875, June 12, 1972, abandoned. This application Jan. 21, 1976, Ser. No. 651,328

Int. Cl.² B32B *7/14*

U.S. Cl. 428—113 **1 Claim**

1. A soft, glossy ribbon having substantially uniform, parallel, fine polypropylene fibers in a substantially longitudinal direction interspersed with coarse fiber junction points wherein said ribbon is much stronger in its longitudinal direction than in its transverse direction and is much stronger in said longitudinal direction as compared to a precursor, non-woven polypropylene, melt-brown article made from a melt-blowing process, which precursor article comprises

a. a mass of self-bonded, polypropylene fibers in a random network with said fibers
   i. having an average diameter of 10 to 40 microns
   ii. with little or no crystallinity and orientation,
b. having a breaking length of from 600 to 2,000 meters,
c. an elongation before break of at least 50%, and an ability to break sharply at said elongation, and
d. a tenacity of less than 0.4 grams per denier, said ribbon having



a. fibers in the longitudinal direction having an average diameter of 1 to 8 microns and being relatively strong, fine, oriented and crystalline, and
b. fibers in the transverse direction having an average diameter of 10 to 40 microns and being relatively coarse, weak and with little or no crystallinity and orientation, said transverse fibers being essentially of the same physical characteristics of those of said precursor non-woven article before conversion to said ribbon, and
c. said ribbon having a tenacity of at least 1.6 grams per denier in the longitudinal direction

wherein the improved properties of said ribbon as compared to said precursor article are obtained by drawing said precursor article at a draw ratio of from 2:1 to 10:1 at a temperature of 200° to 370° F.

4,048,365

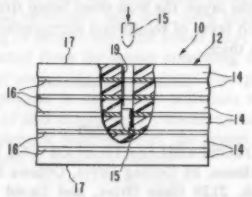
ARMOR STRUCTURE FORMED FROM PLASTIC LAMINATES

William H. Hoover, P.O. Box 2601, San Rafael, Calif. 94902

Continuation of Ser. No. 473,246, May 24, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 610,947

Int. Cl.² B32B *7/02, 17/10*; F41H *5/04, 5/06*

U.S. Cl. 428—215 **5 Claims**



1. Armor structure defining a cured unitary body comprising: a plurality of monolithic plates and means connecting the plates together in a stack with each pair of plates being spaced apart, each plate being comprised of a number of generally spaced mats of glass fibrous material embedded in a cured thermosetting resin to form a monolithic unit each plate having a thickness of at least ¼ inch and a specific gravity of about 1.0, said connecting means comprising a bonding layer including a mat of fibrous material impregnated with a rigid binder material and having a specific gravity of at least 1.5, there being a bonding layer between each pair of adjacent plates, respectively, so as to present an interface between each plate and the adjacent bonding layer at which delamination can occur, each

bonding layer having a thickness in the range of 1/64-inch to 1/16-inch, the outer plates of said stack having exposed outer surfaces through which a projectile must pass before striking the stack so that either outer plate is subject to being directly stuck by a projectile, each bonding layer being bonded to substantially the entire adjacent surface portion of the adjacent plate.

4,048,366

NOISE CONTROL MATERIALS

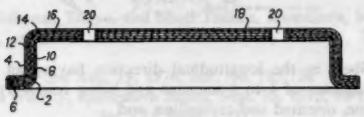
Herbert William Kingsbury, Chislehurst, England, assignor to British Uralite Limited, near Rochester, England

Filed July 14, 1975, Ser. No. 595,722

Claims priority, application United Kingdom, July 26, 1974, 33185/74

Int. Cl.² B32B 7/02, 11/02

U.S. Cl. 428—215 **10 Claims**



1. A noise reducing combination, comprising a component which is prone to vibrate and, applied to at least a part of the surface thereof, a vibration damping material consisting essentially of a laminate of a metallic sheet which is from 0.4 mm to 2 mm thick and has a density of at least 7 gm/cc and wherein the metal is a metal having a shear modulus not exceeding 4×10^{11} dynes per square centimeter and, adhesively bonded to each face of said sheet, a layer of reinforced thermoplastic material comprising a matrix of pliant thermoplastic material reinforced with fibrous material in the form of staple fibers forming a disperse phase in the matrix, wherein the metallic sheet is spaced from said surface of said component by one of said layers of reinforced thermoplastic material.

9. A combination in accordance with claim **1** wherein said laminate comprises a sheet of lead between the bonded to each of two layers of reinforced thermoplastic material each of which comprises bitumen reinforced with staple asbestos fibers which are in the form of a plurality of discrete laminae within the layer, the laminae extending parallel to the plane of the layer and the fibers of each lamina being randomly oriented in the plane of the layer; the lead sheet being from 0.8 to 1.8 mm thick and each layer of reinforced thermoplastic being from 2 mm to 6 mm thick.

4,048,367

PHOTOSTABILIZATION OF POLYMERS

David J. Carlsson, 14 Delong Drive, Ottawa 9, Ontario; Tony Suprunchuk, 2124 Haig Drive, and David M. Wiles, 1927 Fairmeadow Crescent, both of Ottawa 8, Ontario, all of Canada

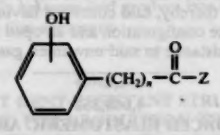
Continuation-in-part of Ser. No. 267,461, June 29, 1972, Pat. No. 3,871,901. This application Mar. 3, 1975, Ser. No. 554,990

Claims priority, application Canada, July 2, 1971, 117203

Int. Cl.² B05D 1/18, 3/14; B32B 27/02, 27/16

U.S. Cl. 428—220 **21 Claims**

1. Thin films, fibers, and filaments of polymeric material having high surface area in relation to volume stabilized against the degradative effects of actinic radiation, comprising said polymeric material containing an energy transfer agent which is incorporated into a thin surface layer having a thickness of not more than 1 micron, said energy transfer agent being a substituted phenol of the formula:



wherein n is 0 or an integer from 1 to 6, and Z is a group —R or —OR wherein R is a hydrocarbyl group, or a derivative of such a substituted phenol in which the benzene ring is substituted by one or more hydroxyl, nitro, halogen, —R or —OR substituents wherein R is a hydrocarbyl group, the amount of energy transfer agent in the layer being at most 0.4% by weight based on the weight of the polymeric material, said energy transfer agent being differentiated from an ultraviolet absorber by a screening test which comprises (i) depositing the energy transfer agent onto a first thin film of a polymeric material in a stabilizing amount, said material having a high inherent transmission of incident ultra-violet radiation in the absence of any ultra-violet stabilizer, (ii) positioning a second film of said polymeric material containing no stabilizer so as to receive only radiation which has passed through said first film; (iii) irradiating said first film which has said agent deposited thereon with ultra-violet light, and (iv) determining the extent of degradation of said second film, said second film being degraded almost as rapidly when an energy transfer agent has been deposited on said first film as when irradiated in the absence of said film, this not being the case when said first film is stabilized with an ultra-violet absorber.

4,048,368

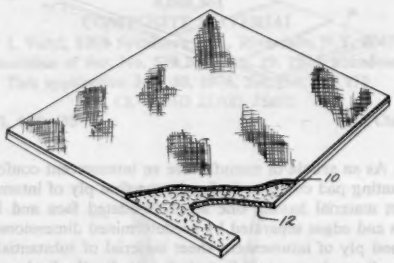
LAMINATED SUBSTRATE FOR AN OFFSET PRINTING BLANKET

Ferrell Daniel Hale, Langdale, Ala., and Charles H. Crowder, West Point, Ga., assignors to West Point Pepperell, Inc., West Point, Ga.

Filed Apr. 19, 1976, Ser. No. 678,436

Int. Cl.² B32B 7/00

U.S. Cl. 428—235 **3 Claims**



1. A substrate for an offset printing blanket comprising:

a woven fabric including spun warp fibers formed from an aromatic polyamide and fill fibers made of polyester, said warp fibers having a tensile stength at least in the order of four times that of cotton; and

a needle-punched non-woven mat laminated to said woven fabric by an adhesive.

4,048,369

METHOD FOR CONTROLLING ALLERGENS

Charles E. Johnson, 5250-19L S. Cherry Creek Drive, Denver, Colo. 80222

Filed Dec. 12, 1975, Ser. No. 640,206

Int. Cl.² B05D 7/24; B32B 27/12

U.S. Cl. 428—262 **4 Claims**

1. A method of controlling pyroglyphid mite activity in fabrics comprising coating the fabric with an aqueous film

forming solution having a pH from between about 7 and 10 to produce a film having a MFT below about 30° C, said film containing a major amount of a polymer having a Tg less than about 20° C wherein the film is hydrophobic, substantially non-nutritive, flexible, continuous and autosoluble.

4,048,370

SHAPED BEARING MEMBER

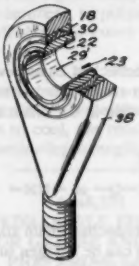
Stanley S. Orkin, Rockville, and Edward John Nagy, Windsor, both of Conn., assignors to Kamatics Corporation, Bloomfield, Conn.

Division of Ser. No. 452,359, March 18, 1974, Pat. No. 3,929,396, which is a continuation-in-part of Ser. No. 241,007, April 4, 1972, Pat. No. 3,806,216. This application Aug. 4, 1975, Ser. No. 601,956

The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.

Int. Cl.² B32B *5/16*; F16C *33/00*; C10M *7/00*

U.S. Cl. 428—323 **1 Claim**



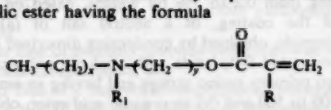
1. A shaped bearing member comprising a substrate provided with a coating of a cured mixture of an acrylate composition and a particulate solid lubricant, said coating having a thickness ranging from 0.002 to 0.125 inch, and said acrylate composition is selected from the group consisting of:

a. a mixture of a major amount of a liquid acrylic ester selected from the group consisting of di-, tri-, and tetraesters of an acrylic acid and a polyhydric alcohol, a minor amount of a low molecular weight prepolymer of an ester of a low molecular weight alcohol having a terminal vinyl group and an aromatic polycarboxylic acid in solution in said acrylic ester and an organic amide of the formula

wherein R is selected from the group consisting of hydrogen and aliphatic hydrocarbon of 1–20 carbon atoms in an amount sufficient to copolymerize said acrylic ester and prepolymer,

b. a mixture of acrylic ester monomer, a peroxidic initiator in an amount sufficient to initiate polymerization of said monomonomer and an aminoalkoxyalkylamine of the formula $R_1N(H)R_2[OR_3]_xN(H)R_4$ wherein x is an integer of 1–6 inclusive, each of R_1 and R_4 is selected from the group consisting of hydrogen and lower alkyl and each of R_2 and R_3 is a lower alkyl linking bridge between N and O, in an amount sufficient to accelerate the polymerization of said monomer,

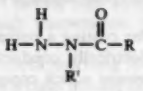
c. a mixture of an acrylic ester of an alkyl amino alkyl alcohol and an effective amount of hydroperoxide catalyst, said acrylic ester having the formula



wherein x is an integer of 0–5 inclusive, y is an integer of 1–6 inclusive, R is selected from the group consisting of hydrogen, halogen, hydroxy, cyano and lower alkyl and R_1 is selected from the group consisting of hydrogen and alkyl having 1–6 carbon atoms,

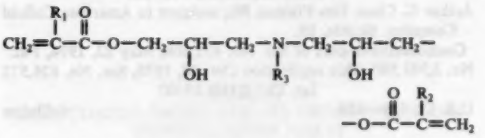
d. a mixture of a liquid acrylic ester monomer selected from the group consisting of diesters of an acrylic acid and a polyhydric alcohol, acrylic esters of cyclic ether alcohols, acrylic esters of amino alcohols and mixtures thereof, a peroxidic initiator and an oxyalkylamine of the formula $(H)_mN[(CH_2)_x(OR_1)_yOR_2]_n$ wherein m and n are each integers of 1 to 2 inclusive, the total of m and n is 3, x is an integer of 1 to 6 inclusive, y is an integer of 0 to 6 inclusive, R_1 is lower alkyl and R_2 is selected from hydrogen and lower alkyl,

e. a mixture of an acrylic ester monomer selected from the group consisting of di-, tri- and tetraesters of an acrylic acid and a polyhydric alcohol, acrylic esters of cyclic ether alcohols, acrylic esters of amino alcohols and mixtures thereof, a peroxidic initiator of an amount sufficient to initiate polymerization of said monomer and a member selected from the group consisting of rhodanine and a hydrazide of the formula.



wherein R and R^1 are selected from separate groups and an interconnected group forming a cyclic ring, R is further selected from the group consisting of hydrogen, alkyl, cycloalkyl, aryl and alkoxy and R^1 is selected from the group consisting of hydrogen, alkyl, cycloalkyl, acyl and dithiocrbony! in an amount sufficient to accelerate the polymerization of said monomer; and

f. a mixture of a monomer of the formula



wherein R_1 and R_2 are selected from the group consisting of hydrogen and lower alkyl and R_3 is selected from the group consisting of lower alkyl, lower hydroxyalkyl, cyano and lower cyanoalkyl; at least one equivalent of an acid for each equivalent of said monomer, said acid being selected from the group consisting of acrylic acid and lower alkyl acrylic acids; an initiator selected from the group consisting of t-butyl perbenzoate, t-butyl peracetate and di-t-butyl diperphthalate, said initiator being present in an amount sufficient to initiate the polymerization of said monomer; a trihydroxy benzene inhibitor and an accelerator selected from the group consisting of benzhydrazide and N-aminorhodanine.

4,048,371

FASCES FIBERS

George Brumlik, Montclair, N.J., assignor to Ingrip Fasteners, Inc., Montclair, N.J.

Filed Oct. 17, 1974, Ser. No. 515,793

Int. Cl.² B32B *27/00*; D02G *3/00*

U.S. Cl. 428—375 **2 Claims**

1. Composite textile filament comprising an assembly of at least two synthetic or natural textile filaments selected from a group consisting of polyester, polyamides, polyimides, rayon, urethane based polymers, cullulose acetate, cellulose triacetate, acrylic polymers, polyolefins, vinyl polymers, protein based polymers, cotton, flax, ramie, wool and animal hair extending together in the longitudinal direction and held to-

gether at joints connecting individual fibers, said joints being spaced in a three-dimensional spatial pattern, said joint pattern

varying both in the axial and radial directions of the individual fibers.

4,048,372

COATING OF CADMIUM STANNATE FILMS ONTO PLASTIC SUBSTRATES

Hiei Ando, and Gottfried Haacke, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Feb. 27, 1976, Ser. No. 661,884
Int. Cl.[3] C01G *11/00*; D01K *1/00*; H01L *15/02*
U.S. Cl. 428—412 **8 Claims**

1. In the process for coating a polymeric substrate with a light transmissive, electrically conductive film of cadmium stannate, the improvement which comprises first coating the substrate with a film of a metal oxide, selected from silicon monoxide, silicon dioxide, titanium dioxide, tantalum oxide, antimony oxide, magnesium oxide, chromium oxide and vanadium oxide.

4,048,373

WATER BARRIER PANEL

Arthur G. Clem, Des Plaines, Ill., assignor to American Colloid Company, Skokie, Ill.

Continuation-in-part of Ser. No. 472,668, May 23, 1974, Pat. No. 3,949,560. This application Oct. 28, 1975, Ser. No. 626,572
Int. Cl.[2] B32B *19/00*
U.S. Cl. 428—454 **6 Claims**

1. A panel for providing a water barrier comprising two opposing spaced sheets having between said spaced sheets a sealant composition comprising bentonite; a water soluble dispersing agent selected from the group consisting of a water-soluble salt of acetic acid, a water-soluble salt of phosphoric acid, and a water-soluble salt of boric acid; and a water-soluble polymer selected from the group consisting of polyacrylic acid, water-soluble salts of polyacrylic acid, hydrolyzed polyacrylonitrile, polyvinyl acetate, polyvinyl alcohol, copolymers of the foregoing, and a copolymer of acrylic acid and maleic anhydride, the amount of water-soluble polymer in said sealant composition being from 0.1% to 3.0%, by weight, and the amount of water-soluble dispersing agent in said sealant composition being from 0.1% to 3.0%, by weight.

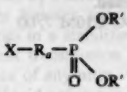
4,048,374

FUNCTIONAL ORGANOPHOSPHONIC ACID ESTERS AS PRESERVATIVE ADHESION PROMOTING AGENTS AND COATING FOR METALS

Hans-Joachim Kötzsch; Claus-Dietrich Seiler, both of Rheinfelden, and Hans-Joachim Vahlensick, Wehr, Baden, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Division of Ser. No. 502,125, Aug. 30, 1974. This application June 26, 1975, Ser. No. 590,642
Claims priority, application Germany, Sept. 1, 1973, 2344197
Int. Cl.[2] B05D *1/36, 3/02, 7/14, 7/16*
U.S. Cl. 428—457 **26 Claims**

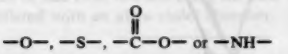
1. A method of protecting the surface of a metal which consists essentially of applying to said metal surface an organophosphorus compound of the formula



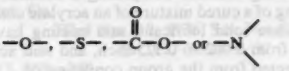
wherein

$a = 0$ or 1

R is a branched or unbranched chain bivalent alkylene radical of 1 to 12 carbon atoms which is substituted or unsubstituted and can contain in the chain structures



R' is a branched or unbranched chain alkyl radical of 1 to 12 carbon atoms which can be halogen substituted and which can contain in the chain structure



X is an epoxy ring, halogen, alkenyl, carboxylic acid ester residue, amino, isocyanato, isothiocyanato, urea, thiourea, urethano, alkyl substituted thio radical or the radical of a heterocyclic ring containing O, S or N in the ring structure.

4,048,375

MAGNETIC RECORDING MEDIA OF IMPROVED MECHANICAL RESISTANCE

Gustav Loewenberg, Ludwigshafen; Hans-Joerg Hartmann, Freinsheim; Dieter Schaefer, Lindenberg; Herbert Motz, and Helmut Jakusch, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 26, 1976, Ser. No. 708,603
Claims priority, application Germany, Aug. 8, 1975, 2535448
Int. Cl.[2] H01F *10/02*
U.S. Cl. 428—474 **4 Claims**

1. In a magnetic recording medium comprising a non-magnetizable base and, applied thereto, a firm adhering coating suitable for magnetic recording and consisting essentially of a finely divided magnetic powder dispersed in an organic polymeric binder, the improvement which comprises: including in said coating from 0.2 to 5% by weight, based on the total weight of the coating, of a neutral salt of (a) a basic polyaminoamide, obtained by condensing dimerized and trimerized unsaturated fatty acids with aliphatic polyamines possessing two primary amino groups and having an amine value of from 100 to 500 and (b) an organic acid ester, obtained by reacting equimolar amounts of a polyalkylene glycol of molecular weight from 100 to 500, a monocarboxylic acid of 10 to 22

carbon atoms and a dicarboxylic acid anhydride or a dicarboxylic acid of 2 to 8 carbon atoms.

4,048,376

LAMINATING COMPOSITIONS AND USES

George E. Unmuth, Tulsa, Okla., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 195,849, Nov. 4, 1971, abandoned. This application Oct. 18, 1974, Ser. No. 516,099

Int. Cl.[2] C09J *3/26*

U.S. Cl. 428—461 12 Claims

1. The process of laminating two plys to each other which comprises applying a composition consisting essentially of

1. about 20–40% by weight of atactic polypropylene having a solid density at 20° C. from 0.75 to 0.89,
2. about 10–25% by weight of a resin selected from the group consisting of petroleum polymer resins produced by treating hydrocarbon mixtures containing diolefins, olefins, aromatics, paraffins and naphthenes with an aluminum halide catalyst at temperatures from −30° to +75° C., terpene polymer resins, rosin resins, rosin ester resins, coumarone-indene, alpha methyl styrene/vinyl toluene, styrene-indene-isoprene terpolymers, terpene phenolics, hydroabietyl alcohol and esters of hydroabietyl alcohol, and
3. microrystalline wax as the balance by weight to one or both plys at a temperature above 225° F. and joining said plys at a temperature above about 225° F. and allowing the joined plys to cool, the resulting laminated structure having good laminating strength at high temperatures.

4,048,377

DRIED REHYDRATABLE FILM CONTAINING AGAROSE OR GELOSE AND PROCESS FOR PREPARING SAME

Egisto Boschetti, Chatou; Yvette Paule Nicole Moroux, Mitry Mory, and Rene Tixier, Paris, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jan. 12, 1976, Ser. No. 648,084

Claims priority, application France, Jan. 14, 1975, 75.00922

Int. Cl.[2] B32B *27/08;* C08L *5/00, 5/12*

U.S. Cl. 428—474 17 Claims

1. A process for preparing a dried agarose or gelose-containing film rehydratable into an aqueous gel film of agarose or gelose, said process consisting essentially of the steps of:

1. forming an aqueous gel film containing at most 5% by weight agarose or gelose and a water-soluble, linear polymer or copolymer of a member selected from the group consisting of acrylamide and methacrylamide, said polymer or copolymer having a viscosity of about 17,000 centipoises or less when in a 5% aqueous solution at a temperature of 22° C, by pouring onto a support a hot glycero-aqueous solution containing the agarose or gelose and said polymer or copolymer and cooling said solution,
2. drying the resulting aqueous gel film, said polymer or copolymer being present in an amount sufficient to maintain said dried film in storage for an extended period of time.

4,048,378

ADHESIVE LAMINATED PACKAGING MATERIALS

Victor J. Pelzek, Milwaukee, Wis., assignor to Browne Packaging, Inc., Milwaukee, Wis.

Filed Dec. 8, 1976, Ser. No. 748,527

Int. Cl.[2] B32B *27/08, 27/30, 27/36*

U.S. Cl. 428—483 8 Claims

5. A flexible, laminated, heat-sealable packaging material comprising

an outer film of biaxially oriented polypropylene or a polyethylene terephthalate, and

an inner film of a heat-sealable, polymeric material bonded to one side of said outer film by an intervening adhesive layer consisting essentially of about 70 to about 90 weight % of an ethylene-vinyl acetate copolymer which contains about 20 to about 40 weight % vinyl acetate, about 10 to about 30 weight % of a tackifying resin, and 0 to about 5 weight % of a plasticizer which is compatible with said ethylene-vinyl acetate copolymer.

4,048,379

WATER-DISPERSION VARNISH FOR ELECTRODEPOSITION

Eiki Jidai; Hiroshi Ono, and Kyoichi Shibayama, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1975, Ser. No. 571,054

Claims priority, application Japan, May 2, 1974, 49-49929; May 9, 1974, 49-51979

Int. Cl.[2] C08F *220/46*

U.S. Cl. 428—500 5 Claims

5. A coated product having high scrape abrasion resistance and a high cut-through temperature, wherein the coating, comprises:

a resin prepared by copolymerizing 30–65 weight percent of acrylonitrile; 5–30 weight percent of ethyl acrylate, n-propyl acrylate, n-butyl acrylate, isopropyl acrylate or n-hexyl acrylate; 2–10 weight percent of glycidyl methacrylate, n-methylol acrylamide, allyl glycidyl ether, methacrylamide or acrylamide, 2–8 weight percent of acrylic acid, methacrylic acid or maleic anhydride and 15–35 weight percent of styrene, methyl methacrylate, alpha-methylstyrene or vinyl acetate.

4,048,380

CAST COATED PAPER AND ITS PRODUCTION AND COMPOSITIONS FOR IT

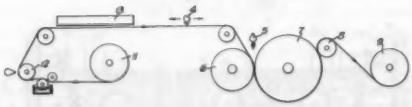
René C. Blakey, Wren Green; Robert G. Riddell, Hoghton; John Whittaker, Darwen, and John A. Wilson, Chadderton, all of England, assignors to Star Paper Limited, England

Filed Jan. 26, 1976, Ser. No. 652,118

Claims priority, application United Kingdom, Jan. 31, 1975, 4234/75

Int. Cl.[2] B05D *3/12*

U.S. Cl. 428—511 28 Claims



1. A process of forming a cast coating on a substrate comprising: applying to the substrate an aqueous coating composition comprising, per 100 parts by weight solids, at least 60 parts pigment and less than 40 parts of a synthetic resin binder, in which from 40 to 100% dry weight of the binder is a polymer which has a Tg from 0° to 45° C and a Tg—Tf from 5° to 25° C. and which is in the form of a latex having an average particle size of less than 0.5 microns; drying the coated substrate so that at least half the water applied with the coating composition is removed; applying water to the surface of the coating and molding the coating.

4,048,381

METHOD FOR MANUFACTURING AN ELECTRO-GALVANIZED STEEL SHEET EXCELLENT IN BARE CORROSION RESISTANCE AND ADAPTABILITY TO CHROMATING, AND PRODUCT THEREOF

Takeshi Adaniya, and Masaru Ohmura, both of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 644,905
Claims priority, application Japan, Jan. 22, 1975, 50-8627; Mar. 28, 1975, 50-36891
Int. Cl.[2] B23P *3/00*; C25D *3/56, 5/48*
U.S. Cl. 428—632 4 Claims

3. An electro-galvanized steel sheet excellent in bare corrosion resistance and adaptability to chromating, characterized by a first galvanizing layer thereon containing at least one compound selected from the group consisting of the oxides and hydroxides of Cr, In and Zr, and at least one compound selected from the group consisting of the oxides and hydroxides of Co.

4,048,382

HIGH-WEAR-RESISTANT COMPOSITE MACHINE ELEMENT

Werner H. Fengler, 23651 Fordson Drive, Dearborn, Mich. 48124

Continuation-in-part of Ser. No. 604,336, Aug. 13, 1975, Pat. No. 3,992,164, which is a division of Ser. No. 506,332, Sept. 16, 1974, Pat. No. 3,991,229. This application Sept. 29, 1976, Ser. No. 727,781
Int. Cl.[2] B32B *15/18, 15/20*
U.S. Cl. 428—651 5 Claims

1. A composite wear-resisting element for a running seal of a machine, comprising

a base portion composed of a metallic material selected from the group consisting of aluminum and iron and subject to excessive wear during operation of the machine,

and a non-porous exposed wear-resistant coating overlying said base portion in fused interpenetrating relationship therewith,

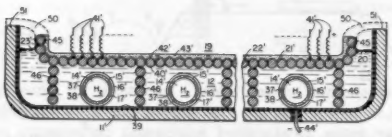
said coating consisting of an alloy composed essentially of molybdenum in the proportion of 80 percent to 60 percent and rhenium in the proportion of 20 percent to 40 percent.

4,048,383

COMBINATION CELL

John E. Clifford, Columbus, Ohio, assignor to Battelle Memorial Institute, Columbus, Ohio

Filed Feb. 9, 1976, Ser. No. 656,659
Int. Cl.[2] H01M *4/00, 8/18*
U.S. Cl. 429—19 31 Claims



1. A combination water electrolyzer and fuel cell for selectively storing and supplying energy while in a substantially fixed position comprising

a pan held in a substantially horizontal position,

an aqueous electrolyte held within the pan,

means communicating with a supply of hydrogen and forming a container for the hydrogen within the pan,

a nonporous hydrogen diffusion negative electrode positioned within the pan, forming at least a portion of the hydrogen container, and having one surface in contact with the electrolyte and an opposite surface communicating with the hydrogen,

means communicating with a supply of oxygen and furnishing the oxygen to a region contiguous with the exposed surface of the electrolyte,

a porous positive electrode in contact with the electrolyte and having a thin substantially flat major portion adjacent and substantially parallel to the upper surface of the electrolyte with a substantial portion of the surface of the positive electrode contacted by electrolyte and adjacent an interface of the electrolyte and the oxygen,

the positive electrode comprising a thin porous conductive member, having on its upper surface a thin porous substantially hydrophobic and nonconductive coating, yieldably supported to permit it to float on the electrolyte with the pores of the electrode at least partly below the upper surface of the electrolyte,

means for connecting the electrodes selectively either to a source of direct current for charging the cell or to an electric load circuit for using the energy stored in the cell when charged,

means for storing in a first confined region the supply of hydrogen, including that produced during charging,

means for storing in a second confined region the supply of oxygen, including that produced during charging,

means for maintaining the temperature, current density, and electrolyte purity and concentration during charging such that substantially all of the hydrogen gas is formed in the hydrogen container, and

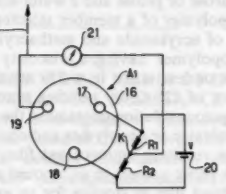
means, comprising the hydrogen container and means communicating therewith and forming an enclosure around the first confined region, for keeping the hydrogen separated from the oxygen.

4,048,384

CONTROL SYSTEM AND APPARATUS FOR REDOX TYPE ELECTROCHEMICAL CELL

Nicole Chillier-Duchatel, Sevres, and Bernard Verger, Chevreuse, both of France, assignors to Societe Generale de Constructions Electriques et Mecaniques "Alsthom et Cie", Paris, France

Filed Apr. 14, 1976, Ser. No. 676,988
Claims priority, application France, Apr. 24, 1975, 75.12850
Int. Cl.[2] H01M *8/18, 8/04*
U.S. Cl. 429—22 14 Claims



1. In an electrochemical cell apparatus of the Redox type having an anode compartment and a cathode compartment separated by a membrane, a first conduit for feeding a reduced form of a first aqueous solution to said anode compartment, a second conduit for conveying an oxidized form of said first aqueous solution from said anode compartment, a first reactor coupled to said first and second conduits and being fed with a combustible reagent for regenerating said reduced form of said first aqueous solution, a third conduit for feeding an oxidized form of a second aqueous solution to said cathode compartment, a fourth conduit for conveying a reduced form of said second aqueous solution from said cathode compartment, and a second reactor coupled to said third and fourth conduits and being fed with an oxidizing reagent for regenerating the said oxidized form of said second aqueous solution,

the improvement comprising

first and second measuring electrodes and a third reference electrode,

means coupling said three electrodes to at least one of said conduits such that at least an end of each of said electrodes is immersed in the aqueous solution flowing in said at least one conduit, said electrodes being electrically insulated from each other,

two resistors connected together in series between said measuring electrodes and defining a junction point therebetween,

a direct current generator coupled to said measuring electrodes for applying a dc voltage across said resistors, and

means coupled between said reference electrode and said junction point of said two series connected resistors for detecting differences between the signals at said junction point and said reference electrode, and means responsive to said differences in signals for controlling the flow of at least one of said reagents.

4,048,385

CROSS-FEED FUEL CELL BATTERY WITH FILTER PRESS TYPE STRUCTURE OF CYLINDRICAL CROSS-SECTION

Bernard Regnaut, Antony, France, assignor to Societe Generale de Constructions Electriques et Mecaniques "Alsthom et Cie", Paris, France

Filed Feb. 2, 1976, Ser. No. 654,727

Claims priority, application France, Feb. 6, 1975, 75.03664

Int. Cl.[2] H01M 8/24

U.S. Cl. 429—34 **9 Claims**

1. A fuel cell battery formed of an assembly comprising plate-like components in a repeating order of sequence combining the elementary sequence of a cathode, a separator, an anode and a collector, each of said components having substantially the same contour and being in the form of thin plates each having a frame of an electrically insulating material surrounding a central active portion, the respective faces of the respective active portions of the cathode and anode components which face away from the separator component being respectively irrigated by the combustion supporting material and by the fuel, and the two faces of the separator component being irrigated by the electrolyte, said fuel cell being characterized by the improvement wherein:

said frames are of circular contour and are bounded by concentric circles, so that each frame is constituted in the shape of a flat annulus made up of 12 successively contiguous sectors of 30° of arc, and each of said sectors is pierced in the axial direction by an opening of a particular shape which is the same in the same sector of each of said frames,

when the components and their frame are assembled, the openings in each sector are in registry so that six pairs of channels are provided, of which a first pair provides the supply of the combustion supporting material to the cathode (1), a second pair the supply of electrolyte for irrigating both sides of the separator (2), a third pair the supply of fuel to the anode (3), a fourth pair the removal of the used combustion supporting material, a fifth pair the removal of the electrolyte and a sixth pair the removal of the reaction products of the fuel,

branch channels are provided by recessed portions of each cathode component frame connecting said first and fourth pairs of channels with the side of said active portion of said cathode component which faces away from the adjacent separator component;

branch channels are provided by recessed portions of each anode component frame connecting said third and sixth pairs of channels with the side of said active portion of said anode component which faces away from the adjacent separator component;

branch channels are provided by recessed portions of each separator component frame connecting said second and fifth channels with both sides of said active portion of said separator component, and

said channels and branch channels are so disposed that the average direction of flow of said electrolyte from said second to said fifth pair of channels across the faces of the separator active portion is at the same predetermined acute angle to the respective average directions of flow of said fuel, from said third to said sixth pair of channels, and of said combustion supporting material, from said first to said fourth pair of channels, across the active portions respectively of said anode and cathode components of the same cell.

4,048,386

PROCESS FOR MAKING AN ELECTROCHEMICAL CELL OR BATTERY, E.G. A FUEL CELL OR FUEL CELL BATTERY, AND A CELL OR BATTERY MADE BY THE PROCESS

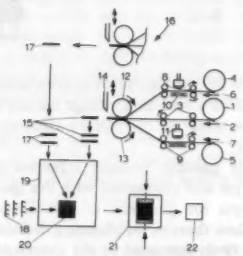
Marinus Alfenaar, Schinnen, Netherlands, and Rene L. E. Van Gasse, Opglabbeek, Belgium, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Aug. 11, 1976, Ser. No. 713,584

Claims priority, application Netherlands, Aug. 14, 1975, 7509675

Int. Cl.[2] H01M 8/24

U.S. Cl. 429—38 **6 Claims**



1. A process for making an electrochemical cell, consisting of a stack of plate-shaped or sheet-shaped electrodes and, between each of the electrodes, plate-shaped or sheet-shaped frames forming gas or liquid chambers, comprising

a. providing at least one electrode, in sheet form, and at least one dry sheet of fibrous-web material which contains a dry unpolymerized thermosetting plastic, polymerization catalyst and fibrous filler,

wherein said sheet of fibrous-web material has been cut to form an opening centrally disposed in the sheet;

b. disposing two of said sheets of fibrous-web material one of said electrodes and subjecting said assembly to sufficient pressure and temperature to cause the fibrous-web material to adhere to the electrode but insufficient to cause polymerization of the thermosetting plastic;

c. stacking a plurality of said assembly together, while chan-

nel-forming elements of material inert to the thermoplastic are disposed to intersect with said opening in said insulating material and at least one edge of the sheet of insulating material, to form a stack;

d. subjecting the stack to sufficient pressure and temperature, to cause the thermo-setting plastic to polymerize;

e. withdrawing said channel-forming elements from the stack, thereby producing channels in the resulting block; cutting passages into the block perpendicular to the channels and intersecting with said channels; and sealing the open ends of the channels at the end of the channel which intersected with the edge of the sheet.

4,048,387

SUBSTANCE AND DEVICE FOR THE ABSORPTION OF CATALYST POISONING GASES OUT OF THE OXYHYDROGEN GAS PRODUCED BY LEAD-ACID STORAGE BATTERIES

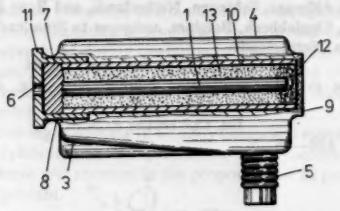
Norbert Wilhelm Lahme, Hoppecke, and Gunter C. Sassmannshausen, Brilon, both of Germany, assignors to Accumulatorenwerk Hoppecke-Carl Zoellner & Sohn, Cologne, Germany

Continuation of Ser. No. 382,201, July 24, 1973, abandoned. This application Jan. 16, 1975, Ser. No. 541,394

Claims priority, application Germany, Aug. 2, 1972, 2237950

Int. Cl.[2] H01M *2/12, 10/52*

U.S. Cl. 429—50 **18 Claims**



1. A device for the catalytic recombination of oxyhydrogen gas produced by a lead-acid storage battery into water and for returning the water to the battery electrolyte, comprising in combination:

a generally gastight housing arranged above the battery electrolyte and connected with the space containing said electrolyte for gas flow communication and for liquid return flow thereto, said housing defining a cavity therein;

a catalyst body mounted in the cavity of the housing, the catalyst body serving to catalyze said recombination of the oxygen and hydrogen gases into water;

a gas permeable containing means positioned in the cavity, said containing means surrounding said catalyst body and being spaced therefrom to define a space therebetween, said containing means also being spaced from the inner wall of said housing, whereby oxyhydrogen gas in said housing cavity is provided access to the entire gas permeable containing means, and therefore, to the entire catalyst body; and

a bed of an absorbing substance comprising a heavy metal manganite and being located in said defined space and surrounding the catalyst body, the absorbing substance serving to eliminate from the oxyhydrogen gas mixture catalyst poisoning gases comprising antimony-hydride and/or arsenic-hydride, which are generated together with the oxyhydrogen gases during battery operation.

4,048,388

CELL OR BATTERY STATE OF DISCHARGE INDICATOR

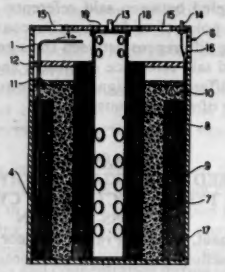
Robert Chevet, St. Benoit, Poitiers, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville and Compagnie Industrielle des Piles Electriques "CIPEL", Levallois-Perret, both of France

Filed Mar. 24, 1976, Ser. No. 669,870

Claims priority, application France, Apr. 10, 1975, 75.11261

Int. Cl.[2] H01M *6/00*

U.S. Cl. 429—91 **14 Claims**



1. Electrochemical generator comprising a positive electrode, an electrolyte, a negative electrode basically containing a first consumable powdered metal and an indicator of the state of discharge of an electrochemical generator comprising a positive electrode, an electrolyte and a negative electrode basically containing a first consumable powdered metal, characterized in that said indicator comprises a sealed transparent enclosure containing a substance which is externally visible and whose appearance changes on coming into contact with the said electrolyte, the said enclosure being sealed by closure means made of a second metal having the same electrochemical behavior as the said first metal.

4,048,389

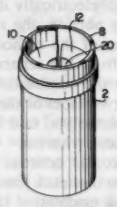
CATHODE OR CATHODE COLLECTOR ARCUATE BODIES FOR USE IN VARIOUS CELL SYSTEMS

Gerald Frank Bubnick, Cleveland, and Lewis Frederick Urry, Columbia Station, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 18, 1976, Ser. No. 659,125

Int. Cl.[2] H01M *6/14*

U.S. Cl. 429—101 **10 Claims**



1. An electrochemical cell comprising a container; an anode disposed within said container; a porous separator disposed within and in surface contact with said anode; a cathode collector in the form of at least two arcuate bodies disposed within said separator; means for biasing said arcuate bodies radially outward against said separator which in turn contacts the anode; and a liquid, active reducible cathode-electrolyte disposed within said container.

4,048,390

NA/S CELL REACTANT CONTAINER WITH METAL ALUMINIDE COATING

Debajyoti Chatterji, Latham, and Robert R. Dubin, Charlton, both of N.Y., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Dec. 20, 1976, Ser. No. 752,369
Int. Cl.[2] H01M 4/36
U.S. Cl. 429—102 1 Claim

1. In a sodium-sulfur battery the improvement which comprises:

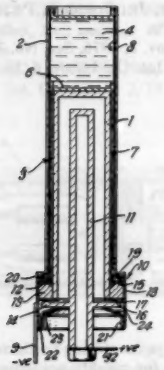
electrically conducting components of said battery comprised of a metal or an alloy having a major amount of a metal selected from the group consisting of iron, cobalt and nickel, having an aluminide coating on surfaces in contact with sulfur.

4,048,391

ALKALI METAL-SULPHUR CELLS

Alec R. Tilley, Blackbrook, near Belper, and Michael D. Hames, Spondon, both of England, assignors to Chloride Silent Power Limited, London, England

Filed Apr. 23, 1976, Ser. No. 679,626
Claims priority, application United Kingdom, Apr. 24, 1975, 17088/75
Int. Cl.[2] H01M 4/36
U.S. Cl. 429—104 12 Claims



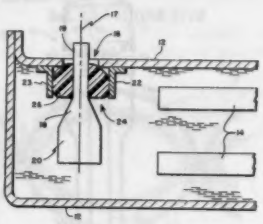
1. An alkali metal-sulphur cell comprising an outer tubular casing, an inner tubular solid electrolyte whose interior constitutes the cathode compartment of the cell containing sulphur material, said inner tubular solid electrolyte being spaced from said outer tubular casing to define an annular space therebetween, at least the part of said annular space adjacent to the outer surface of said inner tubular solid electrolyte constituting the anode compartment of the cell and containing alkali metal, an alkali metal reservoir from which alkali metal is supplied to said anode compartment, and means located between said outer tubular casing and said inner tubular solid electrolyte and surrounding the outer surface of said inner tubular solid electrolyte for limiting material upon mechanical failure of said solid electrolyte.

4,048,392

CRIMP SEAL USING POLYPHENYLENE SULFIDE PLASTIC WITH AN ALUMINUM TERMINAL PAN

Kurt F. Garoutte, Furlong, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 13, 1976, Ser. No. 749,950
Int. Cl.[2] H01M 2/30, 10/38
U.S. Cl. 429—105 15 Claims



1. A terminal pin assembly for a battery, comprising:

an elongated cylindrical pin having a first end for extension exterior of said battery and a second end for extension interior of said battery;

header means forming one end of said battery and finding an opening through which said pin extends, said opening having a diameter larger than the first end of said pin;

bracket means mounted on and extending inward from the interior surface of said header means, said bracket means having a diameter larger than said opening end said header; and

sealing means mounted on said pin and having a diameter essentially equal to said bracket means, said bracket means being forceably enclosed about said sealing means.

7. In an electrochemical cell having a lithium anode and sulfur dioxide depolarizer, the improvement comprising:

a terminal pin assembly for a battery having an elongated cylindrical pin with a first end for extension exterior of said battery and a second end for extension interior of said battery;

header means forming one end of said battery and finding an opening through which said pin extends, said opening having a diameter larger than the first end of said pin;

bracket means mounted on and extending inward from the interior surface of said header means, said bracket means having a diameter larger than said opening end said header; and

sealing means mounted on said pin and having a diameter essentially equal to said bracket means, said bracket means being forceably enclosed about said sealing means.

4,048,393

ALKALI METAL BATTERY STRUCTURE

Walter K. Heintz, Westland, and James N. Lingscheit, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sept. 3, 1976, Ser. No. 720,290
Int. Cl.[2] H01M 2/02
U.S. Cl. 429—104 3 Claims

1. A structure for containing an alkali metal battery which comprises:

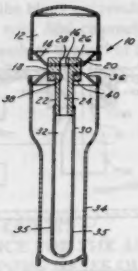
a substantially closed metal housing for containing an electrode reaction zone, said metal housing including a flange, said flange having an opening therethrough;

a first ceramic member bonded to a portion of said flange on an exterior surface of said metal housing, said first ceramic member encircling said opening through said flange and extending away therefrom to define a passageway which is an extension of said opening;

a cation-permeable barrier to mass liquid transfer, said bar-

rier defining an interior volume and its outer surface defining an exterior surface area;

means for connecting said cation-permeable barrier to said first ceramic member in such a manner that the interior volume of said metal housing, said passageway defined by said first ceramic member and said interior volume of said cation-permeable barrier form a first closed electrode reaction zone;



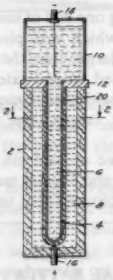
container means including structure contacting said first ceramic member for defining a closed container which encloses said exterior surface area of said cation-permeable barrier, a volume between an interior surface area of said container means and said exterior surface area of said cation-permeable barrier forming a second closed electrode reaction zone.

4,048,394

SECONDARY BATTERY OR CELL WITH VITREOUS CARBON COATED GRAPHITE CURRENT COLLECTOR

Frank A. Ludwig, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 28, 1977, Ser. No. 772,618
Int. Cl.² H01M *10/39*
U.S. Cl. 429—104 **15 Claims**



1. A secondary battery or cell of the type comprising: (A) an anodic reaction zone containing a molten alkali metal reactant-anode in electrical contact with an external circuit; (B) a cathodic reaction zone containing a cathodic reactant which, when said battery or cell is at least partially discharged, is selected from the group consisting of (i) a single phase composition comprising molten polysulfide salts of said anodic reactant and (ii) a two phase composition comprising molten sulfur and molten sulfur saturated polysulfide salts of said anodic reactant; (C) a cation-permeable barrier to mass liquid transfer interposed between and in contact with said anodic and cathodic reaction zones; and (D) a current collector which is at least partially exposed to said cathodic reactant and which is in electrical contact with both said cation-permeable barrier and said external circuit, wherein the improvement comprises:

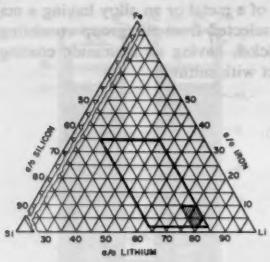
a current collector comprising a graphite body bearing a coating of vitreous carbon on at least those surfaces thereof which are exposed to said cathodic reactant.

4,048,395

LITHIUM ELECTRODE FOR ELECTRICAL ENERGY STORAGE DEVICE

San-Cheng Lai, Woodland Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 18, 1976, Ser. No. 715,358
Int. Cl.² H01M *4/12*
U.S. Cl. 429—112 **16 Claims**



1. A composite negative lithium electrode structure for an electrical energy storage device wherein said composite electrode structure comprises:

an alloy of lithium, silicon, and iron having the empirical formula Li_xSiFe_y, where x has a value from 1 to 5 and y has a value from 0.125 to 1, and

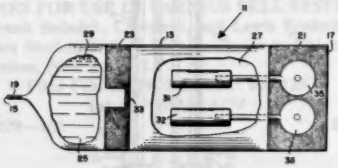
a current-collecting matrix supporting said alloy and in intimate contact therewith.

4,048,396

BATTERY PACKAGE

Edward F. Hollander, Jr., Broomall, Pa., assignor to John P. Glass, Essington, Pa.

Filed Nov. 8, 1976, Ser. No. 739,477
Int. Cl.² H01M *6/30*
U.S. Cl. 429—116 **7 Claims**



1. A battery package for storing an electric battery in unactivated condition and for quickly activating the battery, comprising

a tube of flexible material having first and second ends,

a first seal extending transversely across the tube and closing the first end,

a second seal extending transversely across the tube and closing the second end,

a medial seal extending transversely across the tube at a location between the first and second end seals and forming a first chamber and a second chamber,

an electrolyte contained within the first chamber,

and a pair of electrodes mounted in the second end seal and extending into the second chamber,

said medial seal sealing the electrolyte from the electrodes for storing the battery in unactivated condition,

said medial seal being weaker than said first and second seals, whereby the battery may be activated by squeezing the tube

to rupture the medial seal and transfer the electrolyte from the first chamber into the second chamber to make contact with the electrodes.

4,048,397

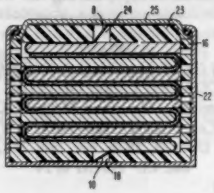
METHOD AND APPARATUS FOR INTERCONNECTING STACKED ELECTRODES OF BATTERIES

Horst Rothbauer, Sarnen, Switzerland, assignor to Maxs AG, Wilen-Sarnen, Switzerland

Continuation-in-part of Ser. No. 541,946, Jan. 17, 1975, abandoned. This application Nov. 24, 1975, Ser. No. 634,548

Int. Cl.² H01M 2/18

U.S. Cl. 429—131 5 Claims



4. Interconnecting and insulating means for electrodes of diverse polarity place one above the other, comprising a band consisting of a length of a conductive strip, a length of an insulating strip, and another length of a conductive strip, said insulating strip being firmly secured between said conductive strips, permitting deformation of said band without disturbing the relative position between said conductive strips and said insulating strip, said band being flexible for placement in zig-zag formation over said electrodes and permeable to the electrolyte by virtue of perforations throughout its length.

4,048,398

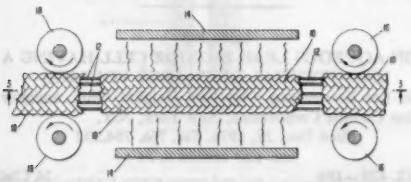
BATTERY ELECTRODE SHEATHS

Erik Sundberg, Yardley, Pa., assignor to Aktiebolaget Tudor, Sundyberg, Sweden

Filed Sept. 2, 1976, Ser. No. 720,087

Int. Cl.² H01M 2/18

U.S. Cl. 429—140 6 Claims



1. An electrode for a lead-acid storage battery, comprising:

a plurality of spaced parallel rods of metallic material, each of said rods being encompassed along a substantial portion of the axial length thereof with active material;

a tubular sheath substantially coextensive with and encompassing each of said rods, whereby the active material is retained on the rods, said sheath comprising:

a braid or weave of inorganic threads; and

a plurality of spaced axial threads extending along the axial length of the sheath and forming crossing points with the inorganic threads of the braid or weave, said axial threads comprising a mixture of at least two thermoplastic materials having different softening temperatures, the inorganic threads of said sheath being held together by adhesion at the crossing points with said thermoplastic fibers having the lower softening temperature.

4,048,399

DOUBLE WALL MULTITUBE BAGS FOR ENCLOSING THE ACTIVE MATERIAL OF POSITIVE PLATES IN ELECTRIC LEAD BATTERIES

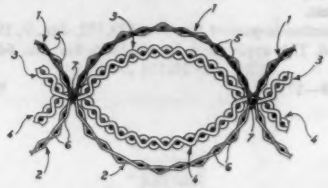
Giovanni Terzaghi, Milan, Italy, assignor to Mecondor S.p.A., Milan, Italy

Continuation of Ser. No. 600,100, July 29, 1975, abandoned. This application Dec. 17, 1976, Ser. No. 751,897

Claims priority, application Italy, Mar. 26, 1975, 21766/75; Apr. 17, 1975, 22459/75

Int. Cl.² H01M 2/18

U.S. Cl. 429—141 15 Claims



1. A multitube bag for enclosing active materials of positive plates in a lead-acid battery, said multitube bag comprising: four layers of woven fabric tied to one another at regular intervals to provide discrete and successive double wall tubes, weft threads of said four fabric layers being parallel to the axes of said tubes, thermosetting resin covering at least partly the yarns of said four fabric layers for stiffening said multitube bag, two of said layers having inner fabric with a weft of substantially high chemical resistance glass yarn and a warp thread of synthetic yarn, two layers having outer fabric with a warp of synthetic yarn and a weft, the weft threads being larger in number than the warp threads in at least the two layers of inner fabric, said synthetic yarn comprising yarn exhibiting substantially high resistance to diluted sulphuric acid and oxidation, the four layers of woven fabric being tied to one another by weft threads inserted between the warps of the four interwoven fabrics.

4,048,400

MULTICELL ELECTRIC BATTERIES

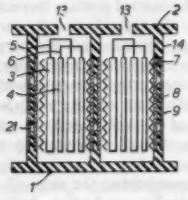
Charles Arthur John White, Redditch, England, assignor to Chloride Group Limited, London, England

Filed May 4, 1976, Ser. No. 683,210

Claims priority, application United Kingdom, May 6, 1975, 18986/75

Int. Cl.² H01M 2/24

U.S. Cl. 429—160 9 Claims



1. A multicell electric battery comprising a number of intercell partitions, each separating a pair of adjacent cells, two or more electrode plates of each polarity in each cell and an intercell connector associated with each intercell partition comprising two spaced parallel conducting sheet portions forming opposite faces of the partition one exposed to each cell, and at least one conducting bridge passing through the partition at a position remote from the edges of the sheet portions and electrically connecting them, each sheet portion

being directly or indirectly connected by pressure contact to the adjacent electrode plate at points distributed over a substantial portion of its area and said plate is electrically connected to at least one other electrode plate of the same polarity in the cell.

4,048,401

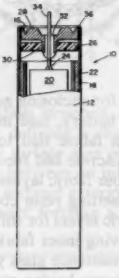
HERMETICALLY SEALED PRIMARY ELECTROCHEMICAL CELL AND A METHOD FOR ITS PRODUCTION

James Epstein, Sharon, and Arthur Y. Chin, Pinehurst, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 539,752, Jan. 9, 1975, abandoned. This application Jan. 8, 1976, Ser. No. 647,396

Int. Cl.² H01M *2/02*

U.S. Cl. 429—171 **9 Claims**



1. A hermetically sealed primary electrochemical cell comprising:

a hollow outer cell casing having a single opening therein, the outer cell casing being formed of a conductive material and being a first terminal of the primary electrochemical cell;

an electrochemical system being disposed within the outer casing and including

an anode in mechanical and electrical contact with the outer cell casing,

a cathode spaced from the anode material, and

a liquid electrolytic solution in contact with the anode and cathode, said electrolytic solution including a solvent and a solute dissolved therein,

an electrically, non-conductive separator being interposed between the anode and cathode;

a glass-to-metal seal being welded into the opening in the outer cell casing to seal hermetically the primary electrochemical cell, the glass-to-metal seal having a metallic feedthrough in the central portion thereof the internal end of which engages the cathode thereby serving as a current collector therefor, the external end serving as a second terminal of the primary elecytrochemical cell, and

means for establishing a temporary seal within the outer cell casing between the weld and the electrochemical system, whereby escape of any volatilized solvent during welding of the glass-to-metal seal is generally prevented.

7. A method of producing a hermetically sealed primary electrochemical cell comprising the steps of:

forming an electrically conductive hollow outer casing having a single opening therein;

placing an anode of a selected electrochemical system within the outer casing and in mechanical and electrical contact with the outer casing so that the outer casing forms one terminal of the primary electrochemical cell;

placing a cathode of the selected electrochemical system and a separator of non-conducting material within the outer casing so that physical contact between the anode and cathode materials is prevented;

filling the outer casing with an effective amount of an electrolytic solution compatible with the selected electrochemical system, said electrolytic solution including a solvent and a solute dissolved therein;

placing a layer of barrier material in sealing contact with the inner wall of the casing to temporarily seal the electrolytic solution from the casing opening;

inserting a glass-to-metal seal into the opening in the outer casing, the glass-to-metal seal having a solid metallic feedthrough in the central portion thereof which engages the cathode material upon insertion and which serves as a current collector therefor; and

welding the glass-to-metal seal to the outer casing to form a hermetic seal, the temporary seal generally preventing volatilization of electrolyte during the welding step.

4,048,402

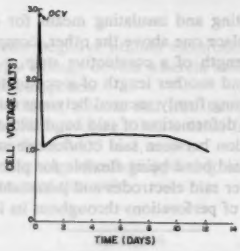
NON-AQUEOUS CELL HAVING A CATHODE OF LEAD MONOXIDE-COATED LEAD DIOXIDE PARTICLES

Marvin Lee Kronenberg, Cleveland Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,531

Int. Cl.² H01M *6/14*

U.S. Cl. 429—194 **10 Claims**



1. A lead oxide cell comprising a highly active metal negative electrode, a positive electrode and a non-aqueous electrolyte comprising a salt dissolved in an organic solvent; said positive electrode comprising lead dioxide particles having a substantially complete outer layer of lead monoxide, and said cell having a substantially unipotential discharge voltage.

4,048,403

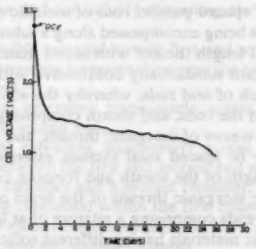
NON-AQUEOUS LEAD DIOXIDE CELL HAVING A UNIPOTENTIAL DISCHARGE VOLTAGE

Marvin Lee Kronenberg, Cleveland Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,532

Int. Cl.² H01M *6/14*

U.S. Cl. 429—194 **24 Claims**



1. A non-aqueous lead oxide cell comprising a highly active metal negative electrode, a positive electrode comprising lead dioxide and an non-aqueous electrolyte comprising a salt dis-

solver in an organic solvent housed within a conductive container; a layer of lead monoxide interposed between, and electrically and physically in contact with, said positive electrode and the inner surface of the conductive container; and said cell having a substantially unipotential discharge voltage.

9. A non-aqueous lead oxide cell comprising a highly active metal negative electrode, a positive electrode comprising lead dioxide; and an non-aqueous electrolyte comprising a salt dissolved in an organic solvent housed within a conductive container; a layer of lead interposed between, and electrically and physically in contact with, said positive electrode and the inner surface of the conductive container; and said cell having a substantially unipotential discharge voltage.

17. A non-aqueous lead oxide cell comprising a highly active metal negative electrode, a positive electrode comprising lead dioxide and an non-aqueous electrolyte comprising a salt dissolved in an organic solvent housed within a conductive container; a layer of lead and lead monoxide interposed between, and electrically and physically in contact with, said positive electrode and the inner surface of the conductive container; and said cell having a substantially unipotential discharge voltage.

4,048,404

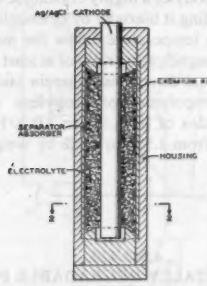
ELECTROPHYSICHEMICAL DEVICE

Per Bro, Andover, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation of Ser. No. 65,174, Aug. 19, 1970, abandoned. This application Mar. 8, 1976, Ser. No. 665,154

Int. Cl.[2] H01M *6/04*

U.S. Cl. 429—199 **6 Claims**



1. An electrical component having a characteristic of both a battery and a capacitor in having a fast chargeable rate much greater than previously available storage batteries comprising; a positive electrode, said positive electroce including a silver element having an active surface layer of solidified, previously fused silver chloride thereon, said silver chloride layer constituting an insoluble, resistive film formed on said silver during charging by passing a high anodic current through the silver element greater than 0.1 amp/cm^2, which resistive film will rapidly heat to fusion temperature during charging; a negative electrode insulatingly spaced from said positive electrode, said negative electrode being cadmium or zinc; an ionic conductor disposed between said two electrodes; said ionic conductor being water and a zinc or cadmium halide or a mixture thereof; a dielectric spacer between said two electrodes, said spacer being capable of retaining its structural integrity at elevated temperatures and capable of withstanding compressive loading; and an encasing housing.

4,048,405

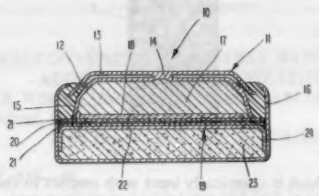
HIGH DRAIN RATE, PRIMARY ALKALINE CELL HAVING A DIVALENT SILVER OXIDE/MONOVALENT SILVER OXIDE DEPOLARIZER BLEND COATED WITH A LAYER OF SILVER

El Sayed Megahed, Madison, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Continuation of Ser. No. 666,657, March 15, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 741,658

Int. Cl.[2] H01M *6/04, 4/02*

U.S. Cl. 429—206 **13 Claims**



1. A high drain rate, primary alkaline cell comprising a negative electrode, a divalent silver oxide/monovalent silver oxide depolarizer blend, a separator between said negative electrode and the depolarizer blend, and an aqueous potassium hydroxide electrolyte, said depolarizer blend containing up to about 70% by weight of divalent silver oxide, and a substantially continuous and electrolyte permeable layer of silver on the surface of the depolarizer blend adjacent to the separator, whereby the cell is characterized by the stability of the depolarizer blend in the potassium hydroxide electrolyte, a maximum open circuit voltage of about 1.75 volts, a single voltage plateau during discharge and is capable of providing a flash current greater than an average of 0.2 amps per square centimeter of cell cross-sectional area.

7. A method for manufacturing the depolarizer blend used in the primary alkaline cell of claim **1** which comprises (1) forming the depolarizer blend comprising divalent silver oxide and monovalent silver oxide, (2) compressing the blend to form a pellet, (3) placing the pellet in a cathode container, (4) consolidating the pellet in the container by compression, and (5) treating the consolidated pellet/cathode container component with a strong reducing agent for a period of time sufficient to reduce the surface of the depolarizer blend to metallic silver.

4,048,406

ELECTRODE FOR A RECHARGEABLE ELECTROCHEMICAL CURRENT SOURCE, AND METHOD OF MAKING SAME

Josef Sándera; Milan Calábek; Miroslav Cenek, all of Brno; František Kaláb; Vojtéch Koudelka, both of Mlada Boleslav; Oldřich Kouril, Brno; Jiri Malik, Mlada Boleslav, and Josef Vaňácek, Brno-Slapanice, all of Czechoslovakia, assignors to Prazska akumulatorka, narodni podnik, Mlada Boleslav, Czechoslovakia

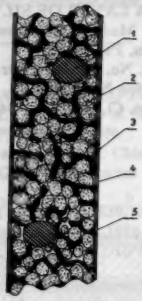
Filed May 21, 1975, Ser. No. 579,481

Int. Cl.[2] H01M *4/02, 4/04*

U.S. Cl. 429—209 **7 Claims**

1. In an electrode for a rechargeable storage battery employing an electrolyte, the electrode having a current collector and a mixture of an active mass and a plastic material distributed over the current collector and sintered thereon to form a skeleton of plastic in the body of said electrode, the improvement which comprises a porous layer of material covering at

least a substantial part of the active surface of the electrode, the porous layer being made of an electrically non-conductive



material which is chemically inert with respect to the electrolyte and which is bonded to the skeleton of plastic material.

4,048,407

ELECTRODE FOR PRIMARY OR SECONDARY BATTERY AND METHOD FOR PRODUCING SUCH AN ELECTRODE

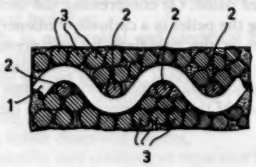
Pieter Abraham Boter, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 9, 1976, Ser. No. 721,662

Claims priority, application Netherlands, Sept. 19, 1975, 7411044

Int. Cl.² H01M *4/38*

U.S. Cl. 429—217 **7 Claims**



1. An electrode for a primary or secondary battery comprising a porous metal support, a porous sintered layer of a powder of an intermetallic compound which can absorb and release reversibly hydrogen while forming hydrides, a hydrophylic water-insoluble macromolecular material in the pores of the sintered layer.

4,048,408

ZINC ELECTRODE FOR ALKALINE RESERVE BATTERIES

Arun Lala, Duisburg, Germany, assignor to Electrochem, Inc., New York, N.Y.

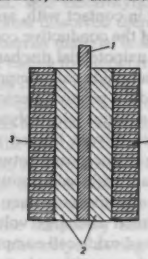
Filed July 26, 1976, Ser. No. 705,750

Claims priority, application Germany, July 16, 1975, 2531751

Int. Cl.² H01M *4/24*

U.S. Cl. 429—229 **12 Claims**

1. An improved zinc electrode for alkaline batteries of the deferred action or reserve type which include a silver oxide electrode and a separator, said zinc electrode including a current collector and a thin sheet of extended surface area, comprising aluminum adjacent to the surface to the said electrode.



4,048,409

ARTICLE MADE OF PROPYLENE-ETHYLENE COPOLYMER

Yasunori Sugita, Tokyo, and Yasuhiko Itagaki, Yokohama, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 506,761, Sept. 17, 1974, Pat. No. 3,944,530. This application Mar. 12, 1976, Ser. No. 666,265

Claims priority, application Japan, Sept. 27, 1973, 48-107953

The portion of the term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Int. Cl.² C08F *210/00*

U.S. Cl. 526—5 **6 Claims**

1. An article having improved transparency, impact strength and moldability which is obtained by cooling and solidifying an extruded tubular body of a highly crystalline olefin polymer and thereafter extending it biaxially by orientation blow molding at an orientation temperature below the melting point to attain an extension magnification ratio of at least 1.5 for each of longitudinal and lateral directions, wherein said polymer is a statistical random copolymer of propylene with ethylene which has a melt index of from 0.6 to 3.0 g/10 min. and an ethylene content of from 1.5% to 5.0% by weight.

4,048,410

ENVIRONMENTALLY DEGRADABLE POLYMER COMPOSITIONS

Lynn J. Taylor, Haslett, and John W. Tobias, East Lansing, both of Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 235,793, March 17, 1972, abandoned. This application Oct. 20, 1976, Ser. No. 734,074

Int. Cl.² C08J *3/20*

U.S. Cl. 526—22 **8 Claims**

1. A process for producing and degrading a polymeric composition comprising:

a. incorporating into a polymeric material a metal chelating organic agent to form a polymeric composition, and

b. subjecting said polymeric blend to a catalytic quantity of metal ions in the presence of oxygen, electromagnetic radiation, or an elevated temperature to degrade said composition,

c. the amount of said metal chelating organic agent incorporated in said polymeric material being sufficient to cause degradation of said polymeric composition when subjected to said metal ions in the presence of said oxygen, electromagnetic radiation, or elevated temperature.

4,048,411

MANUFACTURE OF COPOLYMERS OF ETHYLENE

Franz Georg Mietzner, Ludwigshafen; Klaus Pfleger, Wesseling; Hans Gropper, Ludwigshafen; Oskar Buechner, Dudenhofen; Klaus Boettcher, and Wieland Zacher, both of Wesseling, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, (Rhine), Germany

Filed May 19, 1976, Ser. No. 687,868
Claims priority, application Germany, May 31, 1975, 2524230
Int. Cl.[2] C08F *210/02*
U.S. Cl. 526—64 6 Claims

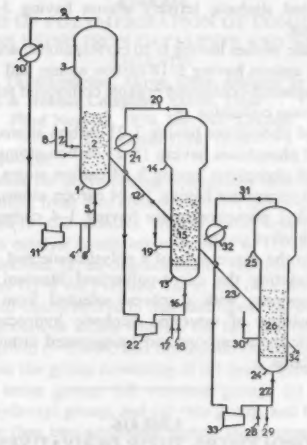
1. A process for the manufacture of an ethylene copolymer which contains up to 30 percent by weight of copolymerized units of vinyl acetate by copolymerization of ethylene and vinyl acetate in a tubular reactor at pressures above 800 atmospheres and at from 150° to 350° C with a mean residence time of at most 100 seconds, wherein the reaction mixture obtained after the polymerization is passed, after leaving the reaction zone, through a cooling zone which is at a pressure below 500 atmospheres and at from 150° to 250° C, into a high-pressure product isolation zone which is immediately downstream from the cooling zone, the pressure in said isolation zone being the same as in said cooling zone, the mean residence time of the reaction product in the cooling zone and product isolation zone together being from 2 to 10 minutes.

4,048,412

DRY POLYMERIZATION OF OLEFINS IN REACTION VESSELS ARRANGED IN SERIES

Francois Caumartin, Martigues; Charles F. Raufast, St. Julien les Martigues, and Laszlo Havas, Martigues, all of France, assignors to Naphtachimie, Paris, France

Filed May 24, 1976, Ser. No. 688,979
Claims priority, application France, May 27, 1975, 75.16514
Int. Cl.[2] C08F *2/34, 10/00, 297/08*
U.S. Cl. 526—65 13 Claims



1. A method of producing polymers having a molecular weight generally higher than 50,000, by the dry polymerization of olefins of the formula $CH_2 = CHR$, in which R is selected from the group consisting of a hydrogen atom and an alkyl radical having from 1 to 8 carbon atoms, in reaction vessels in which the solid polymer in course of formation is kept in the fluidized state by an upward stream of a gaseous mixture containing the olefin or olefins to be polymerized, the reaction vessels being arranged in a series in which the solid polymer in course of formation flows successively from the first reaction vessel through to the last reaction vessel from which the polymer is discharged while a separate recycle is maintained for each reaction vessel with respect to the gaseous mixture of olefin or olefins whereby the said gaseous mixture issuing from one reaction vessel is recycled for reintroduction into the same reaction vessel, polymerization being initiated by introducing into the first reaction vessel a catalyst comprising a solid compound of a transition metal from the subgroups IVa, Va and VIa of the periodic table, and at least one cocatalyst comprising an organo-metallic compound of a metal from group II or III of the periodic table, introducing cocatalyst into the first reaction vessel in an amount such that the atomic ratio of the metal of the co-catalyst or cocatalysts to the transition metal of the catalyst is between 0.1 to 10, and introducing an additional quantity of at least one cocatalyst into at least one of the reaction vessels other than the first.

4,048,413

HIGH-CONVERSION DRIFT-FREE BATCH-TYPE ADDITION COPOLYMERIZATION

James B. Wilkens, Medina, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Filed Dec. 8, 1975, Ser. No. 638,663
Int. Cl.[2] C08F *2/00*
U.S. Cl. 526—66 15 Claims

1. A non-azeotropic batch-type addition copolymerization process for producing copolymer of substantially uniform composition from a plurality of mutually copolymerizable ethylenically unsaturated monomers, each of said monomers designated herein by a different value of the index i other than 0 or ∞, said process comprising

a. forming a reaction mixture comprising a monomer-containing phase in which said monomers are present in substantially those mole ratios f_i of the moles of each of said monomers to the moles of all of said monomers required to initially produce copolymer in which said monomers are incorporated in substantially the desired mole ratios F_i of the moles of each of said monomers incorporated to the moles of all said monomers incorporated, the moles Q_0 of all of said monomers initially present in said monomer-containing phase not substantially exceeding that value which would make the ratio Q_O/Q_∞ equal to the smallest of the ratios F_i/f_i for any of said monomers, where Q_∞ is the total moles of all of said monomers to be copolymerized;

b. initiating an addition copolymerization reaction of said monomers in said monomer-containing phase; and

c. sustaining said reaction in said monomer-containing phase under substantially constant conditions, while simultaneously introducing into said reaction mixture a monomer feedstream which controls the cumulative molar addition of each of said monomers to said monomer-containing phase to have substantially the values given by

$$Q_i = fQ_O + (F_i - fQ_O/Q_{2k})Z$$

when the cumulative moles of all of said monomers converted in said monomer-containing phase to said copolymer is Z, at least until the total unreacted moles of all of said monomers present in said monomer-containing phase is reduced to about $Q_O/2$.

4,048,414

MANUFACTURE OF OLEFIN POLYMERS

Hans Frielingsdorf, Bad Durkheim; Wolfgang Gruber, Frankenthal, and Heinz Mueller-Tamm, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Feb. 13, 1976, Ser. No. 657,863
Claims priority, application Germany, Mar. 4, 1975, 2509261
Int. Cl.[2] C08F *4/02, 4/24*
U.S. Cl. 526—106 1 Claim

1. A process for the manufacture of olefin by polymerization of C_{2-8} monoolefins at temperatures of from 60° to 160° C and olefin pressures of from 0.5 to 40 bars using a silicic xerogel/-chromium trioxide catalyst which has been obtained by (1)

synthesizing a particulate silicic xerogel having a particle diameter of from 10 to 2,000μm, (2) doping said xerogel with from 0.1 to 10% by weight, based on the xerogel and calculated as chromium, of chromium trioxide or a chromium compound capable of converting to chromium trioxide under the conditions at stage (3), from a solution with evaporation of the solvent, and (3) finally maintaining the resulting product at a temperature of from 400° to 1,100° C for from 10 to 1,000 minutes in an anhydrous stream of gas containing oxygen in a concentration of more than 10% by volume, wherein the silicic xerogel/chromium trioxide catalyst is one which has been obtained by

1. synthesizing the silicic xerogel in the first stage by
   1.1. taking a silicic hydrogel having a solids content, calculated as silicon dioxide, of from 10 to 25%,
   1.2. extracting water from said hydrogel by means of an organic liquid selected from the series of C_{1-4} alkanols and/or C_{3-5} alkanones until said organic liquid absorbs no further water,
   1.3. extracting said organic liquid from stage (1.2) from the resulting dehydrated gel saturated with said organic liquid from stage (1.2) by means of hydrocarbon or oxohydrocarbon having a boiling point at 1 bar from −20° to +40° C and a latent heat of vaporization of less than 7 kcal/mole and used in liquid form, until said hydrocarbon or oxohydrocarbon absorbs no further organic liquid from stage (1.2) and
   1.4. drying the resulting dehydrated gel saturated with said hydrocarbon or oxohydrocarbon at product temperatures of from 30° to 140° C and pressures of from 1 to 760 mm of Hg until no further loss of weight occurs at a temperature of 120° C under vacuum of 10 mm Hg in a period of 30 minutes, thereby producing a xerogel, and
2. doping said xerogel in the second stage with the desired amount of chromium from a 0.05–5% w/w solution of chromium trioxide in a C_{3-5} alkanone or of a chromium compound capable of converting to chromium trioxide under the conditions of stage (3) in a C_{1-4} alkanol or C_{3-5} alkanone with evaporation of the solvent, the solution of said chromium component not containing more than 20% by weight of water.

4,048,415

PROCESS FOR POLYMERIZATION OF OLEFINS AND CATALYST COMPOSITION THEREFOR

Norio Matsuzawa, Ohtake; Hidesaburo Oi, Waki; Hiroshi Nishimura; Shigeru Wada, both of Ohtake, and Juntaro Sasaki, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo, Japan

Filed Sept. 30, 1971, Ser. No. 185,378
Claims priority, application Japan, Oct. 2, 1970, 45-85930
Int. Cl.² C08F *4/66, 10/06*
U.S. Cl. 526—119 **40 Claims**

1. A process for the polymerization of alpha-olefins which comprises,

polymerizing or copolymerizing one or more alpha-olefin monomers selected from the group consisting of ethylene, propylene, 1-butene, 3-methyl-1-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene and styrene in the presence of a catalyst, said catalyst consisting essentially of:

A. a titanium trichloride composition and

B. an organoaluminum compound; said titanium trichloride composition (A) obtained by

a. micro-pulverizing

i. a titanium trichloride component prepared by reduction of titanium tetrachloride with hydrogen, silicon, metallic titanium or metallic aluminum,

ii. in the presence of a complex of aluminum chloride or aluminum bromide with an electron-donor in an amount of from 0.005 to 0.5 mol per mol of said titanium trichloride component (i), said electron donor being selected from the group consisting of

1. an oxygen-containing organic compound selected from the group consisting of
   saturated aliphatic monoethers of 2–32 carbon atoms having an alkyl group,
   aromatic ethers of 7–16 carbon atoms having a saturated alkyl group or aryl group,
   halogenated mono- and diethers of 7–16 carbon atoms having at least one aromatic radical,
   saturated alkyl esters of saturated aliphatic monocarboxylic acids having an aliphatic monocarboxylic acid residual group of 1–21 carbon atoms and a saturated alkyl group of 1–16 carbon atoms, unsaturated alkyl esters of saturated aliphatic monocarboxylic acids having a saturated aliphatic monocarboxylic acid residual group of 1–8 carbon atoms and an unsaturated alkyl group of 2–12 carbon atoms,
   alkyl esters of unsaturated aliphatic monocarboxylic acids having an unsaturated aliphatic monocarboxylic acid residual group of 2–12 carbon atoms and a saturated or unsaturated alkyl group of 1–10 carbon atoms,
   saturated alkyl esters of aromatic monocarboxylic acids having an aromatic monocarboxylic acid residual group of 7–18 carbon atoms and a saturated alkyl group of 1–20 carbon atoms;
   saturated aliphatic monoketones having 3–20 carbon atoms,
   saturated aliphatic diketones having 4–12 carbon atoms, and
   aromatic monoketones having 7–18 carbon atoms;
2. a nitrogen-containing organic compound selected from the group consisting of
   saturated aliphatic primary amines having 1–18 carbon atoms,
   saturated aliphatic secondary amines having 2–24 carbon atoms,
   saturated aliphatic tertiary amines having 3–18 carbon atoms,
   aromatic amines having 6–20 carbon atoms, and heterocyclic amines having 5–18 carbon atoms; and
3. a phosphorus-containing organic compound selected from the group consisting of
   trialkyl phosphines having 3–21 carbon atoms,
   triaryl phosphines having 18–21 carbon atoms,
   trialkyl phosphites having 3–24 carbon atoms,
   triaryl phosphites having 18–24 carbon atoms, and
   hexaalkyl phosphoramides having 1–4 carbon atoms in each alkyl group;

iii. and in the copresence of a polysiloxane and

b. extracting the micro-pulverized titanium trichloride component with a solvent selected from the group consisting of saturated aliphatic hydrocarbons, aromatic hydrocarbons and halogenated aromatic hydrocarbons.

4,048,416

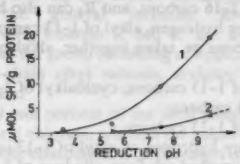
THIOPOLYMERS, THEIR DERIVATIVES AND METHODS FOR THEIR PREPARATION AND USE

Rolf Erik Axel Verner Axen, Balinge; Jerker Olof Porath, and Per Jan Erik Carlsson, both of Uppsala, all of Sweden, assignors to Exploaterings Aktiebolaget T.B.F., Stockholm, Sweden

Filed May 27, 1975, Ser. No. 580,814
Claims priority, application Sweden, May 30, 1974, 7407173
Int. Cl.² C07H *15/04*
U.S. Cl. 526—9 **29 Claims**

1. A product designed for separation purposes, for ion exchange purposes or as basic material for the preparation of various derivatives designed for separation purposes, for the purpose of adsorbing or immobilizing various compounds of in particular biochemical interest, as well as products consisting of derivatives of such product, characterized in that they con-

sist of a water-insoluble hydroxyl or amino group containing polymer substituted with organic side-chains each containing



one or more thiosulphate groups ($-S_2O_3^-$ groups) or derivatives of such groups.

4,048,417

PROCESS FOR PREVENTING BUILD-UP IN POLYMERIZATION REACTORS

Stéphane Noël, Vilvoorde, Belgium, assignor to Solvay & Cie., Brussels, Belgium

Filed Jan. 14, 1976, Ser. No. 649,020
Claims priority, application Luxembourg, Feb. 13, 1975, 71833; July 18, 1975, 73025
Int. Cl.² C08F *2/00*
U.S. Cl. 526—62 **15 Claims**

1. Process for preventing build-up in a reactor during the free radical polymerisation of ethylenically unsaturated monomers, comprising subjecting the walls of the reactor, which reactor is empty of any liquid or solid phase, to heat treatment at a temperature above 60° C for more than one minute before the reactor is charged for purposes of polymerisation.

4,048,418

METHOD OF POLYMERIZATION OF CONJUGATED DIOLEFINS USING IRON CATALYSTS AND NITROGEN LIGANDS

Morford C. Throckmorton, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 22, 1974, Ser. No. 526,345
Int. Cl.² C08D *1/34, 1/14*
U.S. Cl. 526—138 **21 Claims**

1. A process for polymerizing conjugated diolefinic monomers containing from 4 to about 12 carbon atoms by bringing said monomers into contact with a catalytically effective amount of a catalyst consisting essentially of (1) an iron containing compound, (2) an organometallic reducing agent from Groups I and III of the Periodic Table, and (3) a nitrogen-containing ligand characterized in that said ligand has at least two functional groups or atoms wherein the first functional group is a cyano group (—C≡N) and the second functional group is selected from the group consisting of (a) cyano group, (b) azo group, (c) imine group, (d) vinylene group, (e) mercapto group, (f) hydroxyl group, and (g) thio group, and there must not be more than two additional carbon atoms separating the first functional group and the second functional group.

4,048,419

PROCESS FOR THE PRODUCTION OF PARTIALLY CRYSTALLINE POLYBUTENE-1

Albert Frese; Walter Dittmann, and Wolfgang Kilian, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Continuation of Ser. No. 460,904, April 15, 1974, abandoned. This application May 27, 1975, Ser. No. 581,117
Claims priority, application Germany, Apr. 14, 1973, 2318901
Int. Cl.² C08F *2/06, 10/08*
U.S. Cl. 526—153 **12 Claims**

1. A process for the production of partially crystalline polybutene-1 formable into transparent sheets and films which comprises:

i. solution polymerization at 60°–120° C. of 35–98% of butene-1, based on the starting mixture, in excess butene-1 or an inert, low-boiling liquid C_4 solvent consisting of butene-1 and one or both of butene-2 and butane, employing as the polymerization catalyst a mixed catalyst consisting essentially of (a) a thermally unstable $TiCl_3 \cdot n\ AlCl_3$ (n = 0.2 to 0.6) and (b) a mixture of 85–99.9 molar percent of a dialkyl aluminum monochloride and 0.1–15 molar percent of a trialkyl aluminum in a molar ratio of component (b) to component (a) of from 1 to 4:1; and thereafter

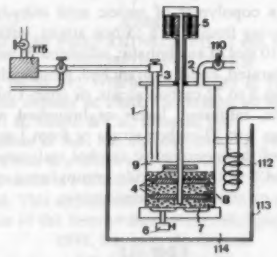
ii. volatilizing the polymerization solvent and recovering the residue containing both the ether soluble and etherinsoluble fractions as the polymerizate.

4,048,420

POLYMERIZATIONS CATALYZED BY VERY FINELY DIVIDED LITHIUM

Bernard Francois, Strasbourg; Michel Vernois, Puteaux, and Emile Franta, Souffelweyersheim, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Jan. 30, 1976, Ser. No. 653,749
Claims priority, application France, Feb. 7, 1975, 75.03891
Int. Cl.² C08F *4/02, 4/08*
U.S. Cl. 526—173 **9 Claims**



1. In a process for the polymerization of monomers comprising reacting at least one conjugated dienic monomer in the presence of an inert solvent and suspended lithium as a polymerization initiator at a temperature between about −40° C to +25° C, the improvement consisting of employing lithium having an average particle diameter of less than about 2 μ.

4,048,421

METHOD OF ANIONING POLYMERIZATION OF UNSATURATED MONOMERS

Jaroslav Kralicek, Prague; Vladimir Kubanek, Kralupy; Jaroslava Kondelikova; Bohuslav Casensky, both of Prague, and Jiri Machacek, Roztoky, all of Czechoslovakia, assignors to Vysoka skola chemicko technologicka, Prague, Czechoslovakia

Filed Oct. 21, 1974, Ser. No. 516,820
Int. Cl.² C08F *112/08, 120/44, 212/08*
U.S. Cl. 526—177 **12 Claims**

1. Method for the anionic polymerization of an unsaturated monomer of the general formula

$$CH_2 = CXY$$

wherein X and Y are selected from the group consisting of hydrogen, aryl, vinyl, —CN, $—NO_2$, COOR and Cl, R being an alkyl group having from 1–6 carbon atoms which comprises adding to said monomer an organic derivative of a metal alumino hydride having the general formula

$$MeAlH_x(OR')_{4-x}$$

wherein Me is a metal selected from the group consisting of the group I(a) and II(a) metals of the Mendeleef Periodic Table, x is an integer ranging from 1–2, R′ is selected from the group consisting of (a) CH_2CH_2OR'' and (b) $CH_2CH_2N(R'')_2$ wherein R″ is an alkyl group having from 1–4 carbon atoms.

4,048,422

PRODUCTION OF COPOLYMER POWDERS FROM MALEIC ANHYDRIDE AND 1-OLEFINS

Günter Sackmann, Opladen; Günter Kolb, Leverkusen, and Friedhelm Müller, Odenthal, Bergisch-Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jan. 8, 1976, Ser. No. 647,502

Claims priority, application Germany, Jan. 14, 1975, 2501123

Int. Cl.² C08F *1/09, 15/02*

U.S. Cl. 526—203 **6 Claims**

1. A process for the production of a copolymer which comprises reacting maleic acid anhydride and an excess of at least one 1-olefin having from 2 to 8 carbon atoms at a temperature of from 30° C to 200° C and a pressure of from 1 to 200 atm in an organic dispersion medium comprising said 1-olefin or said 1-olefin and a solvent which is inert with respect to the monomers and which dissolves the 1-olefin but not maleic acid anhydride, the reaction taking place in the presence of a radical former and from 0.5 to 10% by weight based on the maleic acid anhydride of a dispersion agent soluble in the dispersion medium which is obtained by the reaction of:

I. 1 mol of a copolymer of maleic acid anhydride and a 1-olefin having from 2 to 8 carbon atoms, with

II. from 1 to 10 mol of an aliphatic, saturated or monoolefinically unsaturated, linear or branched, monohydric alcohol having from 8 to 22 carbon atoms, or from 1 to 10 mol of an aliphatic, saturated, linear or branched monoamine having from 8 to 22 carbon atoms or from 1 to 10 mol of a mixture of the monohydric alcohol and monoamine, at least 30 mol% of the anhydride groups being esterified to semi-esters or amidated to semi-amides.

4,048,423

PROCESS FOR POLYMERIZING UNSATURATED MONOMERS AND UNSATURATED POLYESTER RESINS EMPLOYING UNSYMMETRICAL TERTIARY-ALIPHATIC AZOALKANES

Ronald Edward MacLeay, Williamsville, and Chester Stephen Sheppard, Tonawanda, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

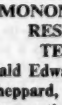
Division of Ser. No. 453,444, March 21, 1974, Pat. No. 4,007,165, which is a continuation-in-part of Ser. No. 149,041, June 1, 1971, abandoned, which is a division of Ser. No. 725,180, April 29, 1968, abandoned, which is a continuation-in-part of Ser. No. 616,158, Feb. 15, 1967, abandoned, which is a continuation-in-part of Ser. No. 409,306, Nov. 5, 1964, abandoned. This application Mar. 29, 1976, Ser. No. 671,914

Int. Cl.² C08F *2/00, 4/04, 20/10, 12/02*

U.S. Cl. 526—209 **4 Claims**

1. In the process for the preparation of polymers or copolymers from unsaturated monomers wherein the polymerization is carried out in the presence of an added free radical affording compound as the polymerization initiator, the improvement which comprises using as said initiator a compound of the formula $(R'')_3C—N{=}N—R'$ in which $(R'')_3C—$ is different from —R′ and wherein:

a. R′ is $—C(R_1)(R_2)(Z)$ or



b. R″ is alkyl of 1–13 carbons, phenalkyl of 7–12 carbons or phenyl, not more than one R″ being phenyl;

c. R_1 and R_2 are alkyl of 1–13 carbons, phenalkyl of 7–12 carbons, cycloalkyl of 3–12 carbons or, taken together, alkylene of 2–16 carbons, and R_2 can also be phenyl;

d. R_3 and R_4 are hydrogen, alkyl of 1–13 carbons, cycloalkyl of 3–12 carbons or, taken together, alkylene of 2–16 carbons;

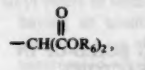
e. R_5 is alkyl of 1–13 carbons, cycloalkyl of 3–12 carbons or aryl of 6–14 carbons;

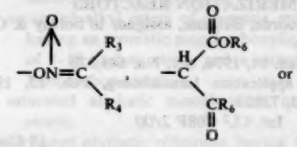
f. R_6 is alkyl of 1–13 carbons;

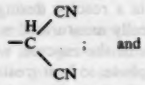
g. R_7 and R_8 are hydrogen or alkyl of 1–13 carbons;

h. R_6 and R_7 together can form alkylene of 2–16 carbons;

i. Z is —Cl, —Br, $—OR_5$, $—N_3$, —SCN, —OCN, —OH, $—NHR_5$, $—R_5$, $—NHNHR_5$, $—OC(=O)OR_5$, $—OC(=O)OOR$,







j. R is $(R'')_3C—$.

4,048,424

NOVEL HYDROCARBON RESINS AND PROCESS FOR PREPARATION THEREOF

Atsuo Ishikawa, Kamakura; Hidemi Tsubaki, Kawasaki; Hitoshi Takahata; Riso Iwata, both of Kamakura, and Yonesaku Shinohara, Toyama, all of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan

Filed July 29, 1975, Ser. No. 599,952

Claims priority, application Japan, Aug. 1, 1974, 49-88247

Int. Cl.² C08F *212/34, 4/00, 236/10*

U.S. Cl. 526—237 **11 Claims**

1. A method for preparing hydrocarbon resin polymers which comprises polymerizing a monomeric mixture consisting essentially of about 35 to 85% by weight of 1,3-pentadiene, (b) about 10 to 50% by weight of α-methylstyrene, (c) about 5 to 30% by weight of cyclopentene and (d) 0 to about 15% by weight of 1,3-butadiene in a solvent comprising at least 50% by weight of an aromatic hydrocarbon and in the presence of an aluminum halide as a catalyst.

4,048,425

ALTERNATING ELASTOMERIC INTERPOLYMERS

Irving Kuntz, Linden, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 459,865, April 11, 1974, abandoned. This application Jan. 21, 1976, Ser. No. 650,974

Int. Cl.² C08F *220/12*

U.S. Cl. 526—245 **1 Claim**

1. An alternating cross-linkable elastomeric interpolymer which comprises:

A. about 50 mol percent of one or more C_1–C_{20} acyclic or alicyclic esters of acrylic acid wherein the ester radical moiety is free of olefinic unsaturation and is selected from the group consisting of straight and branched-chain alkyl

radicals, arylalkyl radicals, cycloalkyl-alkylene radicals and perfluoroalkyl radicals; and a total of about 50 mol percent of:

B. one or more C_2-C_{20} acyclic or alicyclic monoolefins having the general formulae $R—CH=CH_2$ or $R(R')C=CH_2$ wherein R and R' are independently selected from the group consisting of hydrogen, straight and branched-chain alkyl radicals, arylalkyl and cycloalkyl radicals; and

C. 0.3 to 30 mol percent of the total monomers present of vinyl benzyl chloride; wherein the micro-structure of said crosslinkable elastomeric interpolymers is such that monomer units represented by (A) above alternate with either a monomer unit represented by (B) above or a randomly distributed monomer unit represented by (C) above and can be represented schematically by the formula

$$(B\text{-}A)_m \quad (C) \quad (A\text{-}B)_n$$

wherein *m* and *n* are integers on the range of 1 to about 500.

4,048,426

CROSSLINKING IN EMULSION POLYMERIZATION

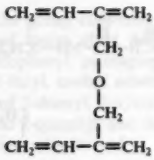
Paul W. Solomon, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 576,945, May 12, 1975, Pat. No. 3,956,400. This application Jan. 26, 1976, Ser. No. 652,443

Int. Cl.[2] C08F *212/08, 216/12, 236/02*

U.S. Cl. 526—334 **6 Claims**

1. In a process for the production of a copolymer from a mixture of monomers wherein at least one monomer is a conjugated alkadiene having 4 to 8 carbon atoms and at least one other monomer of said mixture is a vinyl-substituted aromatic monomer having 6 to 10 carbon atoms or for the production of a polymer of at least one conjugated alkadiene having 4 to 8 carbon atoms by emulsion polymerization wherein said polymerization is carried out under polymerization conditions in the presence of a polymerization initiator, the improvement which comprises carrying out the emulsion polymerization step in the presence of diisoprenyl ether, said ether having the formula



and being incorporated in an amount sufficient to effect crosslinking of the polymer in said polymerization emulsion.

4,048,427

PREPARATION OF SOLUTION POLYMERS

Ivan Glen Hargis, Tallmadge; Russell Anthony Livigni, and Sundar Lal Aggarwal, Akron, both of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 593,579, July 7, 1975, Pat. No. 3,992,561. This application Apr. 26, 1976, Ser. No. 680,247

Int. Cl.[2] C08F *4/46, 4/72, 36/06, 112/08*

U.S. Cl. 526—337 **4 Claims**

1. A rubbery polymer selected from the group consisting of homopolybutadiene-1,3 and a random copolymer of butadiene-1,3 and up to about 15% by weight total of said copolymer of copolymerized styrene and/or isoprene, said polymer exhibiting:

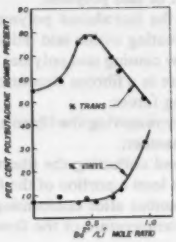
a. a glass transition temperature of from about −80° to −100° C. as determined by differential thermal analysis,

b. a crystalline melting point (peak values) in the unstretched state from about −10° to +43° C. as determined by differential thermal analysis,

c. a trans-1,4 content of from about 70 to 81% and a vinyl content of up to about 12% for the butadiene units,

d. a heterogeneity index of from about 4 to 40,

e. a number average molecular weight of from about 20,000 to 300,000,



f. crystallinity when stretched in the uncompounded and uncured state as shown by x-ray diffraction data,

g. green strength and building tack, and

h. a broad molecular weight distribution as determined by gel permeation chromotography.

4,048,428

METHOD FOR PREPARING A FILM OF VINYLIDENE CHLORIDE POLYMER

William G. Baird, Jr., Winchester; Stanley E. Holbrook, South Acton, and Jeremy A. Platt, Cambridge, all of Mass., assignors to W. R. Grace & Co., Duncan, S.C.

Continuation of Ser. No. 114,692, Feb. 11, 1971, Pat. No. 3,821,182, which is a division of Ser. No. 590,107, June 2, 1966, abandoned, which is a division of Ser. No. 157,194, Dec. 5, 1961, abandoned. This application Apr. 15, 1974, Ser. No. 460,855 The portion of this patent subsequent to June 28, 1991, has been disclaimed.

Int. Cl.[2] C08F *14/08*

U.S. Cl. 526—343 **5 Claims**

1. A substantially unoriented crystalline copolymer film made from a thermoplastic copolymer of vinylidene chloride and at least one copolymerizable monomer wherein the vinylidene chloride is at least 50 percent of the material in the copolymer, said copolymer film having a shrinkability at 96° C of 1 to 5 percent in the transverse direction and 2 to 10 percent in the longitudinal direction, a haze of not over 7 percent, and an elongation of at least 100 percent in both the transverse and longitudinal directions, said film having been made by coextruding said copolymer as a melt between melts of outer plies of thermoplastic polymer through a die so as to produce a copolymer film between the outer plies, said copolymer film being separable from said outer plies, substantially devoid of pinholes and scratches, and having low oxygen permeability.

4,048,429

PROCESS FOR THE PREPARATION OF POLYMER FIBERS

Cornelis E.P.V. van den Berg, Geleen, and Hubertus J. Vroomans, Beek(L), both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Apr. 18, 1973, Ser. No. 352,330

Claims priority, application Netherlands, Apr. 22, 1972, 7205482

Int. Cl.[2] C08F *6/12, 6/06*

U.S. Cl. 528—497 **8 Claims**

1. A continuous process for preparing polymer fibers by concurrent precipitation and agitation of a fiber-forming polymer solution comprising the steps of:

a. preparing a solution of a fiber forming polymer by dissolving the polymer in a solvent therefor;
b. continuously supplying the thus-formed polymer solution to a radial symmetrical chamber;
c. continuously supplying a precipitant for said polymer to said radial-symmetrical chamber in an amount and at a temperature such that the temperature of the polymer solution-precipitant mixture is below the precipitation temperature of said polymer;
d. subjecting the introduced polymer solution to shearing forces by creating within said radial symmetrical chamber a rotary flow causing said polymer in the polymer solution to precipitate in a fibrous structure and form fibers under said shearing forces;
e. continuously removing the fibers and solvent as a mixture from the chamber;
f. separating and collecting the fibers from the solvent; and
g. recycling at least a portion of the fiber free solvent to the rotation chamber after conforming the recycle temperature to the temperature of the flow in the rotation chamber.

4,048,430

MERCAPTOPSEUDOTRISACCHARIDES

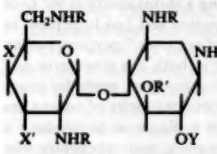
David J. Cooper, Downingtown; John R. E. Hoover, Glenside, both of Pa., and Jerry A. Weisbach, Cherry Hill, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 518,428, Oct. 29, 1974, Pat. No. 3,960,838. This application Dec. 18, 1975, Ser. No. 642,085

Int. Cl.² C07H *15/22*

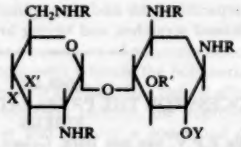
U.S. Cl. 536—17 **12 Claims**

1. A compound of the formula



A

or



B

where

X and X′ are each SR″ or OR′ but are not the same;
each R is hydrogen or an amino protecting group;
each R′ is hydrogen or a hydroxy protecting group;
R″ is hydrogen or a mercapto protecting group; and
Y is 3-amino-3-deoxy-D-glucopyranosyl, 3-acetamido-3-deoxy-D-glucopyranosyl, 3-acetamido-3-deoxy-2,4,6-O-triacetyl-D-glucopyranosyl, or 3-acetamido-3-deoxy-2,4,6-O-tribenzyl-D-glucopyranosyl.

4,048,431

ALKYLATED DERIVATIVES OF ANTIBIOTIC BM123γ

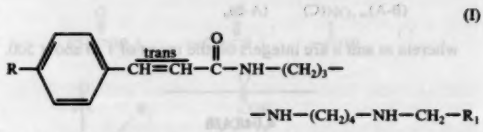
Joseph John Hlavka, Tuxedo, and Panayota Bitha, Pomona, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 612,975, Sept. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 529,862, Dec. 5, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,564

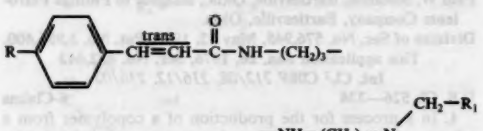
Int. Cl.² A61K *31/71*; C07H *15/22*

U.S. Cl. 536—17 **36 Claims**

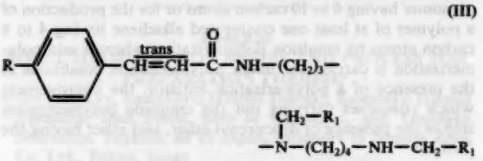
1. A compound selected from the group consisting of those of the formulae:



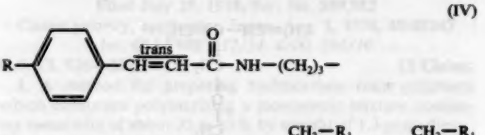
(I)



(II)

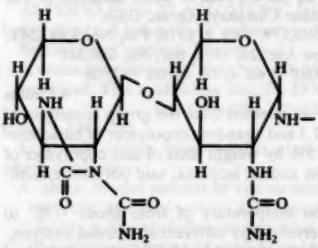


(III)



(IV)

wherein R is a moiety selected from the group consisting of those of the formulae:



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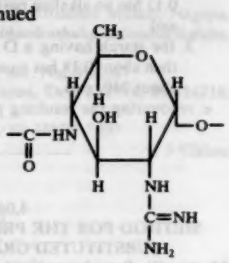
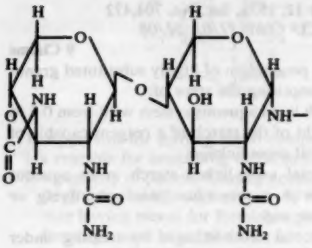
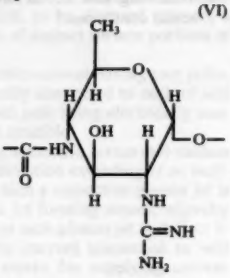


(V)

and



(VI)



R_1 is selected from the group consisting of hydrogen, lower alkyl, halo substituted lower alkyl, lower alkenyl, phenyl, acetamidophenyl, nitrophenyl, mercaptophenyl, anisyl, tolyl, phenyl lower alkyl, 2-furyl, methyl substituted 2-furyl, 2-thienyl, methyl substituted 2-thienyl, 2-pyrryl, methyl substituted 2-pyrryl, 2-pyridyl and 2-quinolyl; and the pharmacologically acceptable acid-addition salts thereof.

4,048,432

9-(3,5-DI-O-ACYL-β-D-ARABINOFURANOSYL)ADENINE COMPOUNDS AND METHOD FOR THEIR PRODUCTION

David Clarkston Baker, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

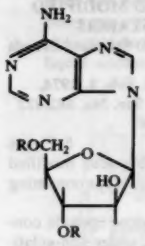
Filed May 17, 1976, Ser. No. 687,270

Int. Cl.² C07H *19/18*

U.S. Cl. 536—26 **8 Claims**

1. 9-(3,5-Di-O-acyl-β-D-arabinofuranosyl)adenine compounds having the formula

-continued



where R is an alkanoyl group having from 2 to 4 carbon atoms.

4,048,433

CELLULOSE ETHERS HAVING A LOW MOLECULAR WEIGHT AND A HIGH DEGREE OF METHYL SUBSTITUTION

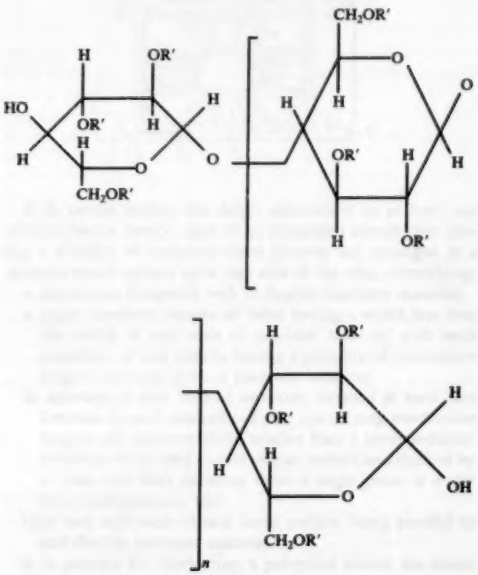
Michael E. Burns, West Chester, and Hans J. Pracht, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 2, 1976, Ser. No. 654,431

Int. Cl.² C08B *11/02, 11/20*

U.S. Cl. 536—99 **4 Claims**

1. A methyl cellulose ether having the structure



wherein R′ is hydrogen or methyl provided the average degree of methyl substitution on the anhydroglucose unit is from 1.8 to 2.7 and *n* ranges from 14 to 54.

4,048,434

METHOD FOR PREPARING AN ACID MODIFIED OXIDIZED HYDROXYALKYL STARCH

Edwin L. Speakman, Clinton, Iowa, assignor to Standard Brands Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 438,820, Feb. 1, 1974, abandoned. This application May 29, 1975, Ser. No. 582,022

Int. Cl.[2] C08B *31/18, 33/08*

U.S. Cl. 536—105 **5 Claims**

1. A method for preparing a gelatinizable acid modified oxidized hydroxyalkyl starch by the sequential steps consisting essentially of:

a. reacting granular starch with a 1,2-alkylene epoxide containing 2 to 4 carbon atoms, inclusively, under non-gelatinizing conditions at a pH of above about 10 to obtain a granular starch having a hydroxyalkyl D of S of from about 0.02 to less than about 0.18,

b. adjusting the pH of the hydroxyalkyl starch to a range of from about 6 to about 8,

c. oxidizing the hydroxyalkyl starch with an alkaline hypochlorite under conditions to introduce an amount of carboxylic groups onto said starch, the amount of carboxylic groups, percent by weight dry starch basis, being no greater than about 1.2 minus the product of 7 times the hydroxyalkyl D of S.

d. treating the hydroxyalkyl oxidized starch with an acid to increase the alkaline paste fluidity thereof, said treatment being carried out under conditions such that

1. the starch having a D of S of from about 0.02 to about 0.1 has an alkaline paste fluidity of less than about 293,

2. the starch having a D of S of from about 0.11 to about 0.13 has an alkaline paste fluidity of less than about 283, and

3. the starch having a D of S of from about 0.14 to less than about 0.18 has an alkaline paste fluidity of less than about 210, and

e. recovering the resulting product.

4,048,435

METHOD FOR THE PREPARATION OF HIGHLY SUBSTITUTED GRANULAR STARCHES

Morton W. Rutenberg, North Plainfield; Wadym Jarowenko, Plainfield, and Martin M. Tessler, Edison, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed July 12, 1976, Ser. No. 704,472

Int. Cl.[2] C08B *31/02, 31/08*

U.S. Cl. 536—106 **9 Claims**

1. A process for the production of highly substituted granular starch products comprising the steps of:

a. reacting the starch in an aqueous system with from 0.5 to 15% by dry weight of the starch of a reagent capable of producing an acetal cross-linkage;

b. reacting said acetal cross-linked starch in an aqueous alkaline system with a mono-functional esterifying or etherifying reagent; and

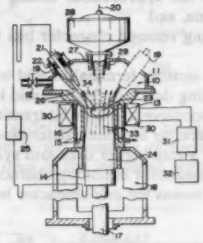
c. removing said acetal cross-linkages by treating under acidic conditions.

4,048,436

HEAT TREATING

Susumu Hiratake, Kasugaishi, and Mitsuhiro Matsui, Nagoya, both of Japan, assignors to Daidotokushuko-Kabushikikaisha, Nagoya, Japan

Filed Oct. 2, 1975, Ser. No. 619,087
Claims priority, application Japan, Oct. 2, 1974, 49-114216; Oct. 12, 1974, 49-117265
Int. Cl.[2] H05H *1/10;* H05B *7/00*
U.S. Cl. 13—2 P 3 Claims



1. Apparatus for melting metal comprising:
i. a crucible for containing metal to be melted therein
ii. a plurality of plasma-forming nozzle devices positioned in fixed relationship with respect to said crucible, each device having means for forming a plasma jet, each such jet forming means being positioned so as, when there is metal in the crucible to be melted, to be directed towards a respective one of a plurality of distinct surface portions of said metal
iii. a first source of direct electric current having two poles, one said pole being electrically connected to each of said nozzle devices, the other said pole being electrically connected to said metal in said crucible
iv. means for generating a magnetic field across said surface portions of said metal in a direction extending at an inclination to the direction in which a respective plasma jet is formed by each said plasma jet forming means, whereby said magnetic field will act on each plasma jet to deflect it,
v. a second source of electric current connected to said magnetic field generating means for supplying current thereto, and
vi. means for controlling the electric current supplied by said second source independently of said direct current, thereby to control said magnetic field to oscillate said plasma jets.

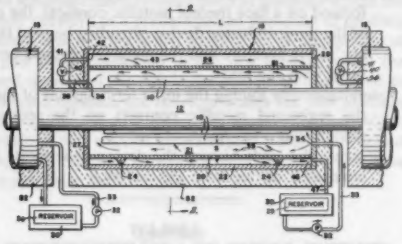
4,048,437

SUPERCONDUCTING MAGNET COOLING SYSTEM

Peter C. Vander Arend, Center Valley, Pa., and William B. Fowler, St. Charles, Ill., assignors to The United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 469,919, May 16, 1974, abandoned. This application June 6, 1975, Ser. No. 584,423
Int. Cl.[2] H01B *12/00*
U.S. Cl. 174—15 S 10 Claims

1. A conductor and a device for cooling the conductor to the superconducting state, comprising:
a supply of liquid coolant in the supercooled state, an inner conduit being coupled to said supply of liquid coolant and having within the interior thereof the conductor and said liquid coolant in contact with said conductor or the entire length thereof so that said conductor is in the superconducting state, a supply of boiling liquid coolant at lower temperature than said liquid coolant, an outer conduit being positioned about and separated from said inner conduit to form a channel between the outer wall of said inner conduit and the inner wall of said outer conduit, and means coupled to said channel and said supply of boiling liquid coolant for pumping said boiling liquid coolant through said channel, the conductor being so separated from the inner wall of said inner conduit that with heat being generated by the conductor at the superconducting state said heat is by convention within said supercooled liquid coolant carried from the conductor to the inner



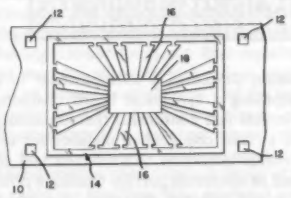
wall of said inner conduit and the flow rate of said boiling liquid coolant through said channel is of such value that sufficient liquid phase remains in said boiling liquid coolant over the length of said conductor to maintain the temperature of the supercooled liquid coolant at a relatively constant value over the length of the conductor.

4,048,438

CONDUCTOR PATTERNED SUBSTRATE PROVIDING STRESS RELEASE DURING DIRECT ATTACHMENT OF INTEGRATED CIRCUIT CHIPS

Richard Henry Zimmerman, Palmyra, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 517,573, Oct. 23, 1974, abandoned. This application Nov. 18, 1975, Ser. No. 633,045
Int. Cl.[2] H05K *1/02;* H01L *23/48*
U.S. Cl. 174—68.5 11 Claims



1. A circuit pattern for direct attachment to at least one semiconductor device, such as an integrated circuit chip having a plurality of terminals fixed thereon and arranged in a predetermined pattern upon one side of the chip, comprising:
a continuous elongated web of flexible insulator material;
a single repetitive pattern of metal having a width less than the width of said web of insulator material with each repetition of said pattern having a plurality of conductive fingers converging on at least one location;
an aperture in said web of insulator material at each said location located centrally of said converging conductive fingers said aperture being smaller than a semiconductor device to be bonded to said circuit pattern and defined by at least two slots radiating from a single point in a star burst configuration; and
each said repetition of said metal pattern being bonded to said flexible insulator material.

4. A process for fabricating a patterned circuit for direct attachment to semiconductor devices, such as integrated circuit chips comprising:
forming in a flexible insulative carrier an aperture having a

periphery which is substantially smaller than that of a semiconductor device intended to be located thereover,

securing a metallic foil to the carrier and removing portions of the foil to form on the insulative carrier a plurality of spaced finger-like leads each extending inwardly to the periphery of the aperture,

locating over the aperture a semiconductor device having formed on a face thereof metallic contacts, the periphery of the semiconductor device extending beyond the periphery of the aperture and the metallic contacts being registered with the leads,

simultaneously joining the inner terminations of the leads to the registered metallic contacts on the semiconductor device, and

severing the leads beyond the device to separate the semiconductor device from the carrier.

4,048,439

CONTROL DEVICE OF A TELETYPEWRITER TO BE USED BY INVALIDS

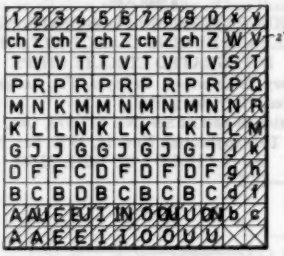
Jean-Claude Gabus, Cornaux, Switzerland, assignor to Carba S.A., Liebefeld, Switzerland

Filed Dec. 1, 1975, Ser. No. 636,704

Claims priority, application Switzerland, Dec. 6, 1974, 16209/74

Int. Cl.[2] G11B *5/02;* **G08C** *1/00*

U.S. Cl. 178—17 C **4 Claims**


1 2 3 4 5 6 7 8 9 0 x y
ch Z ch Z ch Z ch Z ch Z W V
T V V T T V T V T V S T
P R P R P R P R P R P Q
M N K M M N M N M N N R
K L L N K L K L K L L M
G J J G G J G J G J J K
D F F C D F D F D F g h
B C B D B C B C B C d f
A A E E U I N O U U N b c
A A E E I I O O U U

1. In a control device of a teletypewriter to be used by invalids, comprising a synoptical board characterized by a plurality of vowels and consonants thereon arranged in lines and columns, at least one control member for selecting and causing the visible indication of a selected said character on said board, and an electronic part for causing a print-out corresponding to a said selected character; the improvement in which said synoptical board comprises as least one line or column in which all the vowels are grouped without the consonants, there being at least one other line or column on the synoptical board in which a plurality of consonants are grouped without the vowels, said electronic part being characterized by causing the print-out of a said vowel in combination with a said consonant upon selection of a said consonant that lies in a column or line perpendicular to said line or column of vowels and in register with said vowel in the last-mentioned line.

4,048,440

ASYNCHRONOUS-TO-SYNCHRONOUS DATA CONCENTRATION SYSTEM

Richard John Peck, Eatontown, and Shih Yung Tong, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 8, 1976, Ser. No. 739,803

Int. Cl.[2] H04L *7/00*

U.S. Cl. 178—69.1 **5 Claims**

1. In a synchronous digital data transmission system, including a transmission line between system terminals, converters for data characters having start and stop bits and a fixed number of data bits comprising

at a transmitter for one terminal of said transmission line;

first means responsive to a start-bit transition for synchronously sampling the bits in a character at a phase determined by that of said start bit,

first latching means for inhibiting character bits from said first sampling means for one character length,

second sampling means for retiming character bits from said first sampling means according to the substantially constant phase of the synchronous timing assigned to said transmission line, and

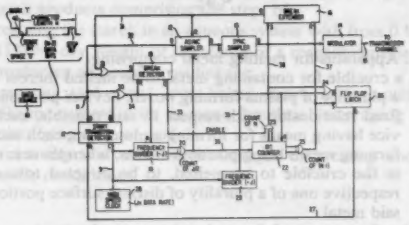
means for applying retimed character bits to said transmission line; and

at a receiver for another terminal of said transmission line;

means for accepting data signals from said transmission line,

second means responsive to a start-bit transition for sampling the bits in a character at a phase determined by that of said start bit but at a rate higher than said synchronous rate,

second latching means for inhibiting character bits from said first sampling means for one character length



storage means traversed by received data signals having at least as many storage positions as there are bits in each character,

means for monitoring the storage positions in said storage means having one binary output when all positions are opposite in binary sense to a stop bit and the other binary output otherwise,

third latching means responsive to the output of said monitoring means for producing a control output when said monitoring means output indicates the absence of a stop bit,

third sampling means for retiming received character bits,

one-bit delay means, and

a pair of steering gates responsive to the control output of said third latching means alternatively providing a direct path or a path through said one-bit delay means for received signals to said third sampling means in accordance with the presence or absence of a stop bit, a missing stop bit being reinserted thereby.

4,048,441

ERROR CONTROL FOR DIGITAL MULTIPOINT CIRCUITS

Charles Edwin Young, Howell Township, Monmouth County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

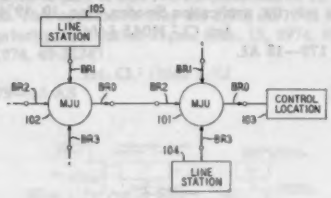
Filed July 6, 1976, Ser. No. 702,957

Int. Cl.[2] H04H *9/00;* **H04Q** *5/00;* **H04L** *25/20*

U.S. Cl. 178—73 **9 Claims**

1. A junction unit having signaling paths interconnecting a plurality of incoming lines with an outgoing line, each of the lines arranged to convey data words which include presence and absence of message information, each of the signaling paths including means for enabling passage of each incoming word on an incoming line to the outgoing line in response to presence of message information in the incoming word whereby the passage enabling means is disabled and blocks the passage of the incoming word in the absence of message information in the word, characterized by

means effective when the passage enabling means is disabled and responsive to an indication of the enabling of the passage of a word by another one of the passage enabling



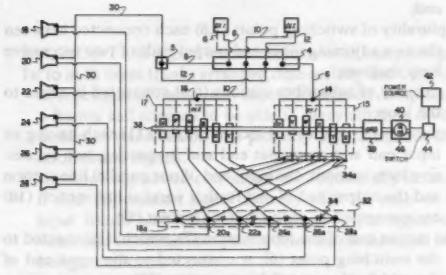
means for rendering the first passage enabling means unresponsive to the presence of message information in subsequent ones of the incoming words on the incoming line.

4,048,442

STEREOPHONIC SOUND ADAPTOR FOR SIMULATING SOUND MOVEMENT

Richard S. Mannila, Star Rt., Box 51, Marcola, Oreg. 97454; Fred E. Mannila, 1425 Hayden Bridge Road, Springfield, Oreg. 97477, and Donald A. Mannila, Star Rte. Box 52, Marcola, Oreg. 97454

Filed May 22, 1975, Ser. No. 579,856
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GP **2 Claims**



1. A stereophonic sound system comprising:

electronic signal input means having first and second separate channels;

an electro-mechanical transfer station including an elongate rotatable shaft driven by a variable speed motor, the transfer station having a first and second separate junction block therein, each junction block connected to a separate channel;

a plurality of individual switches within each separate junction block, the switches all operatively connected to the channel associated with the junction block, the junction block associated with the first channel further including a plurality of resistors, one resistor interposed between each switch within the junction block associated with the first channel;

a first set of individual cams mounted eccentrically on the rotatable shaft, each cam operable to open and close a separate switch within the first junction block;

a second set of individual cams eccentrically mounted on the rotatable shaft separate from the first set of cams, each cam operable to open and close a separate switch within the second junction block;

a speaker network including a plurality of speakers, the network including a speaker terminal block which includes an individual terminal operatively connected to one speaker in the network, each speaker in the network being operatively connected through a terminal to one switch in the first junction block and to one switch in the second junction block;

and a plurality of resistors within the speaker terminal block, one resistor interposed between each of the individual terminals within the terminal block;

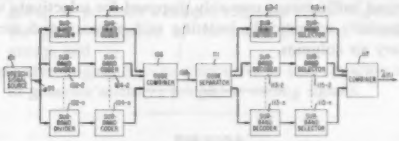
the cams within the first and second junction blocks operable to simultaneously connect pairs of speakers within the speaker network in a predetermined sequence to produce the illusion of moving sound within a room, one speaker of the pair being connected to the first channel while the second speaker of the pair is simultaneously connected to the second channel, the resistors within the first junction block and the resistors within the speaker terminal block operable so that smooth uninterrupted transition of sound through the speaker network is effected when the cams open and close the switches.

4,048,443

DIGITAL SPEECH COMMUNICATION SYSTEM FOR MINIMIZING QUANTIZING NOISE

Ronald Eldon Crochiere, Chatham; James Loton Flanagan, Warren, and Susan Anne Webber, North Plainfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 12, 1975, Ser. No. 640,218
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1 SA **18 Claims**



1. A digital speech communication system comprising a speech signal source; a plurality of bandpass filters connected to said speech signal source for partitioning the short-term speech spectrum of said speech signal into preselected preassigned intelligibility contributing subband portions, each bandpass filter having a lower frequency limit equal to an integer multiple n of the subband bandwidth and an upper frequency limit equal to an integer multiple $n + 1$ of the subband bandwidth; a plurality of subband encoding means, each subband encoding means comprising sampling means connected to a selected one of said bandpass filters adapted to sample the selected subband portion of said speech signal at a rate corresponding to twice the bandpass filter passband and means for digitally encoding each sample from said sampling means; and means for combining the digital codes of said plurality of subband encoding means and for applying said combined codes to a common communication channel.

4,048,444

PHONOSTETHOSCOPE CONVERSION UNIT FOR AMPLIFICATION AND CLARIFICATION OF CORPOREAL SOUNDS

Vincent C. Giampapa, 47 Addison Drive, Fairfield, N.J. 07006

Filed Aug. 15, 1975, Ser. No. 605,047
Int. Cl.² H04R *1/46;* A61B *7/04*
U.S. Cl. 179—1 ST **4 Claims**

1. An electronically assisted stethoscope comprising:

a. a chestpiece member;

b. a pair of electronic conversion units;

c. an integral air column member connecting each of said electronic conversion units to said chestpiece member;

wherein said pair of electronic conversion units are independently operable and are positioned at the output end of the acoustic path so as to constitute the output elements of said electronically assisted stethoscope,

and wherein said electronic conversion units each comprise:

a. a primary and a secondary air column;
b. a first electroacoustic transducer means in acoustic communication with said primary air column for converting acoustic signals into corresponding electrical signals;
c. amplifying means connected to said first electroacoustic transducer means for amplifying said electrical signals;
d. a second electroacoustic transducer placed in acoustic

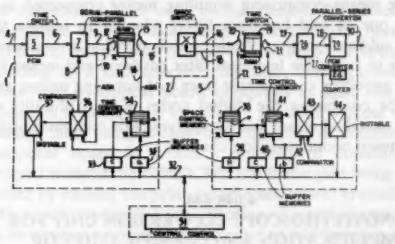
communication with said secondary air column for producing amplified acoustic signals corresponding to said amplified electrical signals;
e. an earpiece member in acoustic communication with said secondary air column; and
f. sound baffle means movably disposed for selectively substantially acoustically isolating said primary and secondary air columns.

4,048,445

METHOD FOR THROUGH CONNECTION CHECK IN DIGITAL DATA SYSTEM

Walter Ghisler, Upplands Vasby, Sweden, assignor to L.M. Ericsson Pty. Ltd., Australia

Filed Aug. 11, 1975, Ser. No. 603,501
Claims priority, application Australia, Aug. 9, 1974, 8462/74
Int. Cl.² H04J 3/14
U.S. Cl. 179—15 BF **5 Claims**



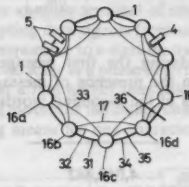
3. A method of checking the correct connection establishment between desired input and output points in a digital data system including one or more switches between said points, said switches being under common control and wherein said data is transmitted with a parity bit, the method comprising the steps of:
a. introducing an incorrect parity bit in one or more particular input words in a digital data bit stream at said desired input point after said connection has been established, and
b. checking the output points of said switch by said common control for parity of the data words corresponding to said particular input words in order to obtain information indicating the correct connection establishment.

4,048,446

DATA TRANSMISSION SYSTEM

Emanuel R. Hafner, Wohlen, and Zdenek Nenadal, Bern, both of Switzerland, assignors to Hasler AG, Bern, Switzerland

Filed Dec. 3, 1975, Ser. No. 637,283
Claims priority, application Sweden, Dec. 10, 1974, 7416355
Int. Cl.² H04J 3/14
U.S. Cl. 179—15 AL **5 Claims**



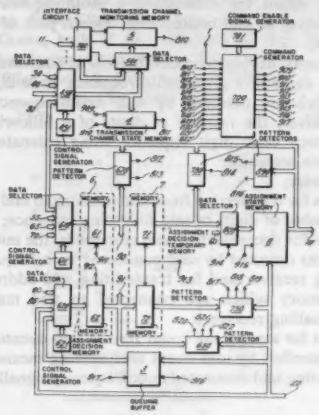
1. A data transmission system comprising
a unidirectional transmission loop, consisting of a plurality of loop sections (1,7,9) each having an input and an output end;
a plurality of switching points (2,6) each connected between the two adjoining input and output ends of two successive loop sections;
a plurality of subscriber stations (4,5) connected in series to the loop;
a plurality of parallel line sections (3,8,10,11) each having an input end and an output end and by-passing two successive loop sections, the input end of one parallel line section and the output end of one further parallel line section (10) are connected to each switching point (6);
the output end of the loop section (7), which is connected to the switching point (6), is connected to the input end of the said further parallel line section (10);
switching means (81–83) included in each switching point having a first position connecting the output end of the loop section (7), which is connected to the switching point, to the input end of the loop section (9), which is connected to the switching point, and having a second position connecting the output end of said parallel line section (8), which is connected with the switching point, to the input end of the loop section (9), which is connected to the switching point;
failure detecting means (71–74) included in each switching point having an input connected to the output end of the loop section (7) which is connected to the switching point and having an output delivering an output signal in response to signal failures at its input;
control means (78,80) each associated to one switching means and having a first control input connected to the output of the failure detecting means of the respective switching point and a second control input connected to the output of the failure detecting means of the preceding switching point;
each switching means (81–83) is in the first position when no failure signal is present on the first control input, and is in the second position when a failure signal is present at its first control input and simultaneously no failure signal is present at the second input (FIG. 1 and 5).

4,048,447

PCM-TASI SIGNAL TRANSMISSION SYSTEM

Rikio Maruta, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 557,835, March 12, 1975, abandoned. This application May 20, 1976, Ser. No. 688,243
Claims priority, application Japan, Mar. 15, 1974, 49-30178; Mar. 22, 1974, 49-32347
Int. Cl.² H04J 6/02
U.S. Cl. 179—15 AS 7 Claims



2. A PCM-TASI signal transmission system comprising:

1st to *m*-th input trunks arranged time-serially and consisting of repetition of frames and superframes each comprised of n frames and adapted to be able to carry out time division multiplex transmission of a plurality of intermittent PCM information signals,

information signal detector means for sequentially detecting if said information signal actually exist on each of said input trunks and for transmitting an output signal only when said information signal is detected on the input trunk being monitored,

1st to *s*-th ($s<m$) transmission channels arranged time-serially similarly to said input trunks for transmitting said information signals received via said input trunks,

connecting means capable of selectively connecting said input trunks to said transmission channels,

assignment control means responsive to the output signals transmitted in sequence from said information signal detector means for controlling said connecting means so as to selectively assign said transmission channels to those among said trunks on which said information signals exist only during the period in which said information signal persists,

means for generating signals representing the state of said selective assignment and for transmitting the same along with said information signals, and

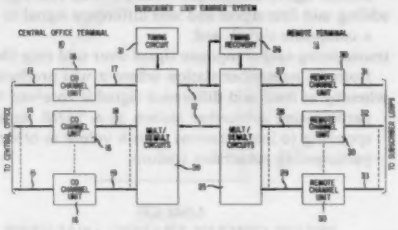
means on a receiver side of said transmission system for detecting said signals representing the state of assignment and for distributing the information signals received via said transmission channels to 1st to *m*-th output trunks in a manner similar to the corresponding input trunks in response to said signals representing the state of assignment; characterized in that said transmission system comprises variable signal transmission means for varying the sequence of transmission of the output signals from said information signal detector means to said assignment control means at least for every one of said superframes.

4,048,448

MULTIPARTY TELEPHONE RINGING

Ronald Jay Canniff, Mount Arlington, and Mark Thomas Manfred, Rockaway, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 19, 1976, Ser. No. 659,369
Int. Cl.² H04M 3/02
U.S. Cl. 179—17 E 13 Claims



1. A digital selective calling circuit for party line telephone systems comprising:

means connected to termination of said party line for generating repetitive selective party identification cyclic serial pulse coded groups of signals,

detector means connected to the other termination of said party line responsive to each said serial pulse coded signal group to produce a unique response signal regardless of the phase sequence of the pulse positions within said group; and

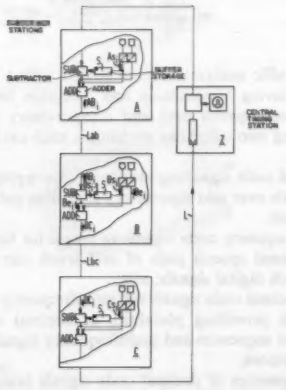
selective ringing circuits responsive to said response signals to generate selective telephone calling signals.

4,048,449

METHOD FOR FORMING A CONFERENCE CONNECTION IN A TELECOMMUNICATION SWITCHING SYSTEM

Roderich Natebusch, Ottobrunn, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 18, 1975, Ser. No. 614,695
Claims priority, application Germany, Sept. 20, 1974, 2445092
Int. Cl.² H04M 3/56
U.S. Cl. 179—18 BC 2 Claims



1. A method for connecting at least three subscribers participating in a conference call in a pulse code modulation (PCM), time division mulitplex(TDM) telecommunication system having subscriber stations connected in a ring-like TDM circuit, comprising the steps of:

generating in each said participating subscriber station a first

TDM signal corresponding to the instantaneous value of a speech signal issuing from that subscriber station,

storing said first TDM signal in the subscriber station where it is generated for a period of a signal cycle through said ring-like circuit,

subtracting a second signal from an incoming signal from other subscriber stations in the time position assigned to the conference call to produce a difference signal, said second signal being a previously stored first signal,

adding said first signal and said difference signal to produce a composite signal, and

transmitting said composite signal over said ring-like circuit from the subscriber station where it was produced,

whereby at least said difference signal is received by a said participating subscriber station as a TDM signal corresponding to instantaneous speech values in others of said participating subscriber stations.

4,048,450

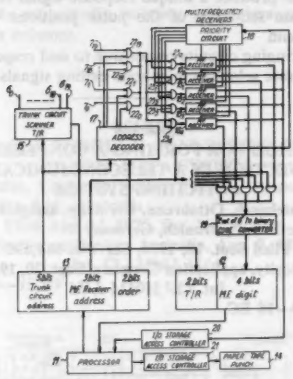
TRUNK CIRCUIT TRAFFIC ANALYZER

Jean-Michel Bernard, 10, rue du Viaduc, 92130 Issy-les-Moulineaux; Lucien Labboz, 25, avenue de Gaulle, 92190 Meudon, and Daniel Vesque, 15 ter, rue Roger Salengro, 92120 Montrouge, all of France

Continuation-in-part of Ser. No. 518,102, Oct. 25, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,668

Int. Cl.[2] H04M *7/06*

U.S. Cl. 179—18 EB **3 Claims**



1. A traffic analyzer in combination with a group of trunk circuits having transmission and reception lines including a bidirectional speech path and a supervisory signalling path connecting two telephone exchanges, each exchange comprising:

decimal code signalling means for conveying decimal code signals over said supervisory signalling path of each trunk circuit;

multifrequency code signalling means for feeding said bidirectional speech path of said trunk circuits with code speech digital signals; and;

said decimal code signals and multifrequency signalling code digits providing pluralities of decimal signalling code signal sequences and multifrequency signalling code digit sequences;

the sequences of decimal code signals being composed of different signals unambiguously defining certain phases of a telephone call and comprising a signalling code change signal and the sequences of multifrequency code digits being catenated sequences defining certain other phases of a telephone call and being composed of a number of multifrequency code digits variable according to the phases they define;

said traffic analyzer comprising means for cyclically sampling said decimal signalling code signals;

means for connecting said sampling means to said transmission and reception lines of said trunk circuits;

means controlled by said sampling means for sensing said signalling code change signal;

a number of multifrequency signalling receivers which are smaller than the number of trunk circuits in said group;

said receivers detecting said multifrequency signalling code digits;

means controlled by said signalling code change signal sensing means for connecting a multifrequency signalling receiver to said bidirectional speech path of a trunk circuit;

a memory having recorded therein at addresses formed by the digits of a given multifrequency code digit sequence which are detected by said multifrequency signalling receiver, the number of digits of a following multifrequency code digit sequence being catenated with said given sequence;

a counter;

means for transferring from said memory to said counter said number of digits of said following sequence;

means for decrementing said counter by the multifrequency digits detected by said connected multifrequency signalling receiver and for transmitting said addresses to said memory which are connected to said multifrequency signalling receivers;

means for sensing the count zero in said counter and means controlled by said count zero sensing means for disconnecting said connected multifrequency signalling receiver.

4,048,451

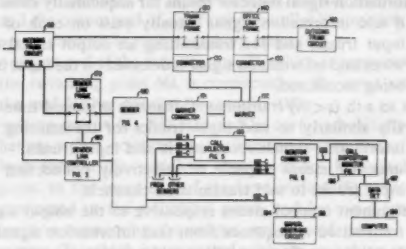
ARRANGEMENT FOR MONITORING LIVE CALL DISPOSITION SIGNALS

Gary Keith McNees, Monmouth Beach, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 19, 1976, Ser. No. 668,596

Int. Cl.[2] H04M *7/00, 3/24*

U.S. Cl. 179—18 AH **13 Claims**



8. In a telecommunications switching system in which each of a group of signals applicable at a destination side of a cross-office connection during the establishment of a call thereover has a unique tone pattern and represents a distinct disposition of said call, said system including one of a plurality of trunk circuits seized for use to establish said call and operable in a split condition wherein any of said group of signals applied at said destination side is isolated from other signals generated at an originating side of said one of said trunk circuits, an arrangement for automatically monitoring said one of said trunk circuits to determine an actual disposition of said call comprising:

means for maintaining said one of said trunk circuits in said split condition subsequent to the establishment of said call, and

means connected to said destination side of said one of said trunk circuits and operative during the continuance of said split condition by said maintaining means for detecting only a one of said group of signals representing said actual

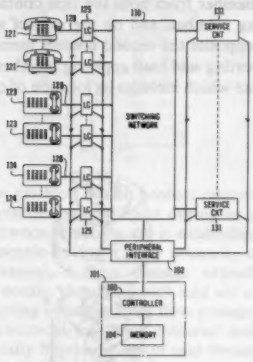
disposition in response to a receipt of a tone pattern thereof in the absence of interference by said other signals generated at said originating side.

4,048,452

AUTOMATIC CALL DISTRIBUTION SYSTEM

Hans Oehring, Glen Ellyn, and Philip Joseph Rossomando, Downers Grove, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 28, 1976, Ser. No. 690,995
Int. Cl.[2] H04Q *3/64*
U.S. Cl. 179—27 D **11 Claims**



1. Telephone call handling apparatus for use in combination with a plurality of telephone lines and a plurality of groups of call answering stations, and comprising:

detection means for detecting from said lines dialing signals defining a called number identifying one of said groups of call answering stations;

clock means for generating time signals defining present time;

means for recording the identity of a line from which dialing signals defining a called number are detected by said detection means and for recording time signals generated by said clock means and representing time of request for said called number;

circuit means for comparing said recorded time signal with current time signals generated by said clock means, and for generating difference signals defining a time difference between said recorded time signals and said current time signals;

means for generating time trigger signals defining numerical constants representing first and second time triggers;

means for comparing said difference signals and said time trigger signals for generating a first output signal when the numerical value represented by said difference signals exceeds the numerical value of said first time trigger and for generating a second output signal when the numerical value represented by said difference signals is less than the numerical value of said second time trigger;

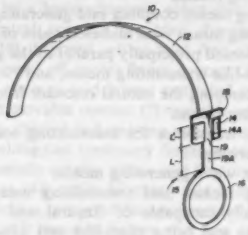
means responsive to said first output signal generated with respect to time of request for a first called number and said second output signal generated with respect to time of request for a second called number to connect a line from which dialing signals defining said first called number are detected to a call answering station of the group of call answering stations identified by said second called number.

4,048,453

TELEPHONE HANDSET SUPPORT DEVICE

Gustave Seidel, 333 Passaic St., Hackensack, N.J. 07601

Filed Feb. 11, 1976, Ser. No. 656,999
Int. Cl.[2] H04M *1/05*
U.S. Cl. 179—156 R **8 Claims**



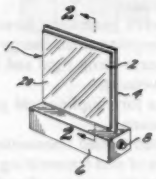
1. Telephone handset supporting device comprising a semi-circular headband member and an essentially planar telephone headset attachment member, said headband member being ribbon-like and having interlocking attachment means for detachably receiving a cooperating interlocking member on said telephone attachment member and wherein a flat surface of said headband member cooperates with a flat surface of said attachment member to preclude relative rotation.

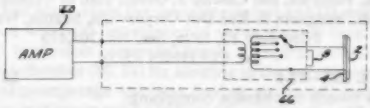
4,048,454

SONIC TRANSDUCER EMPLOYING RIGID RADIATING MEMBER

Lester M. Barcus, 252 Tivoli Drive, Long Beach, Calif. 90803, and John F. Berry, 3392 St. Albans Drive, Los Alamitos, Calif. 90720

Filed Dec. 2, 1974, Ser. No. 528,671
Int. Cl.[2] H04R *3/00, 7/02, 7/26, 17/00*
U.S. Cl. 179—110 A **24 Claims**





1. A sonic transducer for transmitting sonic signals in a medium comprising:

piezoelectric sonic energy generating means, said generating means having opposed generally planar electrodes,

sonic energy transmitting means, said transmitting means being sheet-like and rigid and substantially incapable of flexural and diaphragm-like movement,

coupling means for coupling said generating means to said transmitting means,

said coupling means coupling said generating means to said transmitting means with said electrodes of said generating means oriented principally parallel to the general plane of said sheet-like transmitting means, and

means for damping the natural resonant frequencies of said transmitting means.

14. A sonic transducer for transmitting sonic signals in a medium comprising:

compression wave generating means,

transmitting means, said transmitting means being rigid, substantially incapable of flexural and diaphragm-like movement and being sheet-like and generally flat, said transmitting means comprising glass,

coupling means for coupling said generating means to said transmitting means,

means for damping the natural resonant frequencies of said transmitting means, and

said damping means being sheet-like and generally flat and comprising a rigid wooden body adhesively secured to said transmitting means.

17. A sonic transducer for transmitting sonic signals in a medium comprising:

compression wave generating means,

transmitting means, said transmitting means being rigid and substantially incapable of flexural and diaphragmlike movement, said transmitting means being generally curved,

coupling means for coupling said generating means to said transmitting means, and

means for damping the natural resonant frequencies of said transmitting means.

20. A speaker system for radiating sonic energy into a medium and for use with an audio amplifier supplying electronic audio signals comprising:

a. compression wave generating means,

b. means for transmitting sonic energy into said medium, said transmitting means being rigid and substantially incapable of flexural movement,

c. coupling means for coupling said generally means to said transmitting means,

d. means connected to said transmitting means for damping gross vibrations of said transmitting means associated with natural resonant frequencies of said transmitting means,

e. an air core transformer having a primary winding connected to receive said audio signals, said transformer having a secondary winding connected to said compression wave generating means,

f. a diaphragm-type woofer speaker connected in parallel with said primary winding of said air core transformer, and

g. capacitor means connected in series with said primary winding of said air core transformer.

4,048,455

PRESSURE SWITCH WITH PLURAL AXES PIVOTED CONDUCTION PLATE

Alan K. Forsythe, and Charles J. Green, both of Vashon Island, Wash., assignors to Red Dot Corporation, Seattle, Wash.

Filed July 12, 1976, Ser. No. 704,479

Int. Cl.[2] H01H *35/24*

U.S. Cl. 200—81.4 **12 Claims**

1. A switch mechanism comprising:

first and second spaced apart fixed contact members which are electrically insulated from each other and which in use form parts of an electrical circuit;

a movable conductive member which is not connected to either one of said contact members but underlies the first contact member and overlies the second contact member;

a biasing member which is electrically insulated from both of said contact members, making point contact with said conductive member at a location that is offset from both of said contact members on the side of said conductive member facing towards the second contact member;

means mounting said biasing member for reciprocating movement along a line which includes its point of contact with the conductive member and which extends generally transversely of said conductive member;

spring means normally biasing said biasing member towards said conductive member and said conductive member into contact with said first contact member and into a spaced relationship with the second contact member;

a load applying member making contact with said conductive member at a location spaced towards the second contact member from both the first contact member and the biasing member, and on the side of said conductive member opposite the second contact member;

means supporting said load applying member for movement along a line which includes its location of contact with the

conductive member and which also extends generally transversely of the conductive member; and

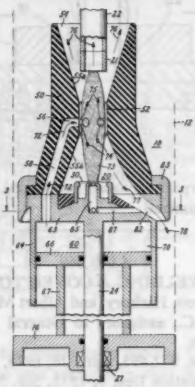
with the relative spacing of the first and second contact members, the contact point of the biasing member with the conductive member, and the location of contact of the load applying member with the conductive member, being such that a first movement of the load applying member towards the conductive member will pivot the conductive member in position about a first axis which includes its location of contact with the first contact member, to depress said biasing member, compress said spring means, and move said conductive member into contact with the second contact member and complete a conductive path through the conductive member from one of the contact members to the other, and a subsequent additional movement of the load applying member in the same direction will cause the conductive member to pivot in position about an axis which includes its location of contact with the second contact member, to further depress said biasing member, further compress said spring means, and move said conductive member out of contact with the first contact member to in that manner open said conductive path.

4,048,456

PUFFER-TYPE GAS-BLAST CIRCUIT BREAKER

Heinz Otto Noeske, Cherry Hill, N.J., assignor to General Electric Company, Philadelphia, Pa.

Filed Apr. 1, 1976, Ser. No. 672,822
Int. Cl.[2] H01H *33/70*
U.S. Cl. 200—148 A 5 Claims



1. A puffer-type gas-blast circuit breaker comprising:

a. a pair of electrodes, spaced apart during an interrupting operation, between which an arc is established,

b. a dual-flow nozzle having a body primarily of electrical insulating material, a flow passage extending axially through said nozzle, through which said arc extends during an interrupting operation, said flow passage containing a throat of electrical insulating material and divergent sections at axially opposed sides of said throat,

c. a plurality of injection passages extending generally radially of said nozzle in the region of said throat and intersecting said throat at the inner ends of said injection passages,

d. a plurality of feed passages located within said nozzle body, communicating with said injection passages, and extending between said injection passages and one end of said nozzle,

e. pump means located at said one end of said nozzle and operable during a circuit-breaker opening operation for injecting arc-extinguishing gas through said feed passages and said injection passages into said throat,

f. and means for forcing the gas injected into said throat to flow within said flow passage axially of said arc in two streams directed in opposite directions from said throat toward said electrodes, said means comprising a plurality of exhaust ports at said one end of the nozzle extending transversely of said flow passage from said flow passage to the exterior of said nozzle in locations circumferentially spaced from said feed passages, the inner ends of said exhaust ports being disposed in a region surrounding one of said electrodes, one of said divergent sections defining a flow zone about the exterior of said one electrode leading to said exhaust ports.

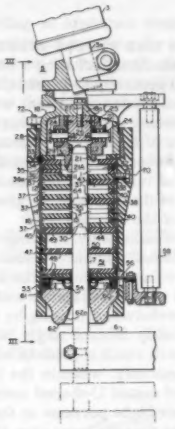
4,048,457

CIRCUIT-INTERRUPTER GRID STRUCTURE FOR AN OIL-BREAK CIRCUIT INTERRUPTER

Charles W. Tragesser, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 343,071, March 20, 1973, abandoned.
This application Jan. 8, 1975, Ser. No. 539,549
Int. Cl.[2] H01H *33/68*
U.S. Cl. 200—150 R 12 Claims

1. A liquid-break type of circuit-breaker including a tank containing an arc-extinguishing liquid, a pair of terminal-bushings extending downwardly within said liquid-containing tank, each carrying an interrupter grid-unit (5), each grid unit (5) including at least three vertically segregated arc-extinguishing liquid chambers (42, 43, 44), means defining a first upper arc-extinguishing liquid chamber (42) particularly adaptable for interrupting high-amperage-value fault currents, said first chamber (42) being completely enclosed except for a lateral relatively-small vent opening (11), said first chamber (42) being partially defined by a lower-disposed valve plate (37) having only a small central opening provided therein, stationary contact means (19) disposed within said first chamber (42) including an elongated off-center finger contact (21A) extending downwardly close to said lateral restricted vent opening (11), a rod-shaped movable contact (7) movable upwardly and downwardly in its closing and opening movements and cooperable with said elongated stationary finger contact (21A) to establish an arc initially wholly within said first arc-extinguishing liquid chamber (42) while blocking said central opening (37) with valve action, means defining a second liquid interrupting chamber (43) disposed below said first chamber (42) and having said valve plate (37) forming its upper end, said second chamber (43) having at least two lateral vent openings (12, 13) in alignment with said first-mentioned restricted vent opening (11) and having at least one splitter plate (39) therebetween for effecting arc looping therearound into said two lateral vent openings (12, 13), said second chamber (43) being



particularly adaptable for interrupting medium-value fault currents, a second valve plate (37) with a relatively-small central opening closing the lower side of said second interrupting chamber (43) with said movable rod contact (7) making valve action therewith, means defining a third interrupting chamber (44) disposed below said second chamber (43) and particularly adaptable for interrupting low-value currents and additionally having at least a pair of lateral vent openings (15, 16) therein also in alignment with the aforesaid vent openings (11, 12, 13), said third chamber (44) being located below said second-mentioned valve plate (37) and having its lower end closed by a third valve plate (49) having only a small central valve opening therein, a splitter plate disposed between the two lateral vent openings (15, 16) of the third interrupting chamber (44) to provide arc looping around the said last-mentioned splitter plate, again the movable contact-rod (7) making valve action with said last-mentioned valve-plate, at least one additional lowermost separate liquid completely-confined interrupting chamber (50, 51) for assisting in the interruption of the low-value-amperage currents having no lateral venting whatsoever, said lower-most additional liquid chamber (50, 51) having its upper and lower boundaries defined by valve-plates (49), and said interrupting unit 5 having a bottom apertured nozzle member (62) with a central orifice opening therein out

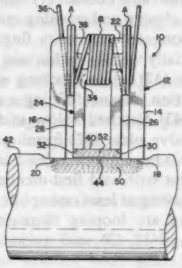
of which the movable contact rod (7) moves at the end of the opening operation.

4,048,458

INDUCTION HEATING CORE STRUCTURE AND METHOD OF HEATING

Robert Louis Zirk, Sr., Huntley, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed May 21, 1976, Ser. No. 688,860
Int. Cl.² H05B 5/08
U.S. Cl. 219—10.79 **7 Claims**



1. A composite core and coil structure for use in heating workpieces by induction, including a first generally U-shaped core and a second generally U-shaped core nestably associated with the first core, exciter coil means wrapped about portions of each core providing at least one turn which simultaneously encircles portions of both cores, the coil means providing a predetermined number of turns about the first core different than the number of turns about the second core, the length of the legs portions of the first core are greater than the length of the leg portions of the second core.

7. A method of adhesively securing a first metallic workpiece of predetermined volume to a second metallic workpiece of a greater total volume, including the steps of placing the first workpiece on the second workpiece with a layer of heat activable adhesive therebetween, heating by induction, both workpieces simultaneously from a single side so that the faying surface of each will reach a predetermined temperature substantially simultaneously, wherein the induction heat is provided by a pair of nested U-shaped cores with an exciter coil wound about their bight portions so that the outermost core has more windings than the inner core, the outermost core legs contacting the second workpiece while the inner core legs contact the first workpiece whereby the second workpiece will be subjected to a greater amount of heating flux than the first workpiece.

4,048,459

METHOD OF AND MEANS FOR MAKING A METALIC BOND TO POWDERED METAL PARTS

Michael Earle, Mapleton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

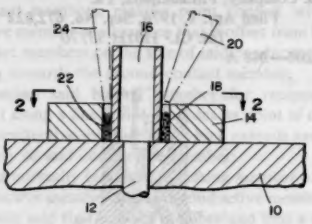
Filed Oct. 17, 1975, Ser. No. 623,540
Int. Cl.² B23K 26/00, 1/04
U.S. Cl. 219—85 BM **6 Claims**

1. The method of making a metallic bond between a powdered metal part and a second part comprising the steps of:

a. positioning said powdered metal part in selected close spaced juxtaposition to said second part to provide a given space therebetween;

b. introducing brazing metal powder which melts at a lower temperature than said powdered metal part and said second part into said given space between said parts at a given time rate; and

c. impinging a beam of coherent electromagnetic energy on said brazing metal powder in said space, said beam being fully received within said space to fully melt said brazing metal powder at said given time rate and of such intensity and for such duration whereby deleterious brazing metal



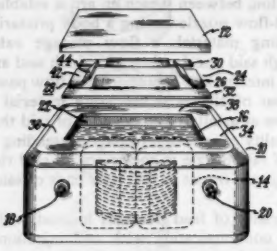
powder absorption by said powdered metal part is substantially minimized.

4,048,460

METHOD OF WELDING A COVER TO A CONTAINER

Moreland P. Bennett, Hickory, and Albert M. Hobbs, Jr., Conover, both of N.C., assignors to General Electric Company, Philadelphia, Pa.

Division of Ser. No. 572,455, April 28, 1975, Pat. No. 3,962,662.
This application Dec. 5, 1975, Ser. No. 637,950
Int. Cl.² B23K 11/10
U.S. Cl. 219—91 **3 Claims**



1. A method of welding a cover to a container using a metal gasket comprising the steps of

a. providing a metal gasket from a thin strip of metal,

1. said gasket being bent along its longitudinal axis forming a flat portion and a bent portion,

b. placing said metal gasket on the edge of the container,

c. placing said cover on said container in contact with said gasket,

d. clamping said cover onto said container,

e. and welding the edges of said cover to said container.

4,048,461

APPARATUS FOR WELDING CONTACT BEADS ON AN ELECTRICALLY CONDUCTIVE SUBSTRATE

Johann Kopf, Buching-Greith, Germany, assignor to Otto Bihler Maschinenfabrik GmbH & Co. KG, Halblech near Fussen, Germany

Filed Nov. 17, 1975, Ser. No. 632,652
Claims priority, application Germany, Nov. 19, 1974, 2454804
Int. Cl.² B23K 11/02
U.S. Cl. 219—104 **13 Claims**

1. Apparatus for welding a contact bead to a face of an electrically conductive substrate comprising:

a. a base;

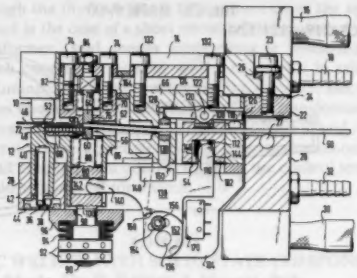
b. a first electrode fixedly mounted on said base;

c. a second electrode movably mounted on said base;

d. actuating means for moving said second electrode between a welding position adjacent said first electrode and

a feeding position remote from said first electrode,

1. said electrodes in said positions defining therebetween a gap adapted to receive said substrate,
2. said second electrode being formed with a receptacle open toward said first electrode in the direction of movement of said second electrode and open in a direction transverse to said direction of movement; and



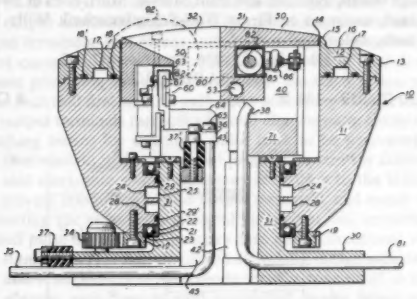
e. feeding means for sequentially feeding blanks of contact bead material to said receptacle, said feeding means including a guide member fixedly mounted in said base and defining a path of movement for said contact bead material aligned with said receptacle in said feeding position and said second electrode, said path extending in said transverse direction.

4,048,462

COMPACT ROTARY EVAPORATION SOURCE

Russell J. Hill, and Kazumi N. Tsujimoto, both of El Cerrito, Calif., assignors to Airco, Inc., Montvale, N.J.

Filed Jan. 17, 1975, Ser. No. 541,743
Int. Cl.² C23C *13/12*
U.S. Cl. 219—121 EB **11 Claims**



1. An electron-beam apparatus for evaporating material placed on a hearth, comprising:

a hearth mounted for rotation about a generally vertical axis, the hearth having a point which is furthest from the axis and an annular area for receiving material to be evaporated, the annular area lying generally in a horizontal plane perpendicular to the rotational axis;

an electron-beam gun which can be energized to form an electron beam for evaporating material located within an impact area in the annular area on the hearth, all of which electron-beam gun is located closer to the rotational axis than the point of the hearth which is furthest from the axis; and

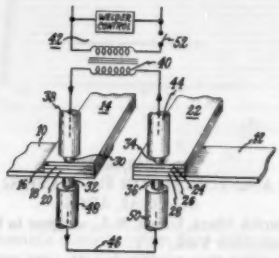
magnetic means for deflecting the beam from the electron gun to the impact area along a curved path the final portion of which path is directed generally away from the axis of rotation.

4,048,463

METHOD OF JOINING ALUMINUM TO ALUMINUM

Moreland P. Bennett, Hickory, N.C., and William L. Bowers, Shreveport, La., assignors to General Electric Company, Philadelphia, Pa.

Filed Dec. 8, 1975, Ser. No. 638,300
Int. Cl.² B23K *11/18*
U.S. Cl. 219—118 **11 Claims**



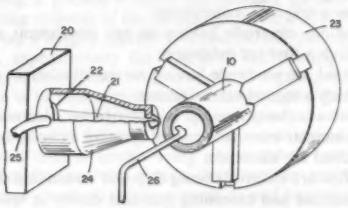
1. A method of welding at least two aluminum members together comprising the steps of retaining the oxide coating on the surfaces of the aluminum to be joined, placing the oxide coated surfaces in overlapping contact, applying pressure to said contacting members through hard, high-electrical resistance electrodes, and applying welding current to said electrodes to weld said aluminum members by thermal heat from said electrodes and resistance heat from said oxide coating.

4,048,464

METHOD OF AND MEANS FOR CUTTING HOSE FOR HIGH PRESSURE HYDRAULIC SYSTEMS

Preston Lee Gale, East Peoria, and Warren Jess Stafford, Peoria, both of Ill., assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 22, 1975, Ser. No. 607,076
Int. Cl.² B23K *26/00*
U.S. Cl. 219—121 LM **5 Claims**



1. The method of cutting hose for use in high pressure hydraulic systems to length which hose comprises a rubber wall having a plurality of layers of metal fibers embedded therein and extending longitudinally of said hose, said method comprising the steps of:

a. positioning a free end of said hose for the cutting of a given length therefrom;

b. impinging a high power laser beam on a limited area of an exterior surface of said hose at said given length from said free end thereof of sufficient intensity and for a sufficient time to vaporize a portion only of the material of said hose at said limited area without deleterious heating of the material of said hose in immediately adjacent areas thereof in the absence of auxiliary heat sink cooling of said immediately adjacent areas;

c. moving said impingement of said beam about the periph-

ery of said hose to successively impinge upon contiguous limited areas in a peripheral line corresponding to the desired cut in a plurality of repeated passes until said given length of said hose at said free end thereof is separated from the remainder of said hose by vaporization of material at said line corresponding to the desired cut; and

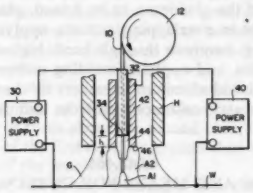
d. simultaneously flooding said limited area of impingement of said beam with an inert gas to prevent combustion of said vaporized material.

4,048,465

METHOD AND TORCH FOR SUSTAINING MULTIPLE COAXIAL ARCS

August Frederick Manz, Union, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 1, 1975, Ser. No. 636,624
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 R **14 Claims**



1. An arc working torch for establishing multiple independent arc discharges in a coaxial relationship to one another from at least one source of power, with said arc discharges originating on separate electrodes and terminating upon a common workpiece, comprising:

a first arc electrode having an arc attachment end upon which a first arc originates;

a second arc electrode having an arc attachment end upon which a second arc originates;

the arc attachment end of said second arc electrode having an annular cross-section and forming a cavity within said second arc electrode;

said first arc electrode being disposed within said second arc electrode and extending into said cavity in spaced apart relation to the annular cross-section arc attachment end of said second arc electrode;

the arc attachment end of both said first and second arc electrodes adapted to be spaced apart a predetermined distance respectively from the workpiece to provide a nonconstricting arc sustaining region between said electrodes and said workpiece for establishing separate coaxial arcs between said first and second arc electrodes and the workpiece;

means located a predetermined distance from the arc attachment end of said second arc electrode for transferring current to said first arc electrode;

means for transferring current to said second arc electrode;

means for cooling said first and second arc electrodes; and

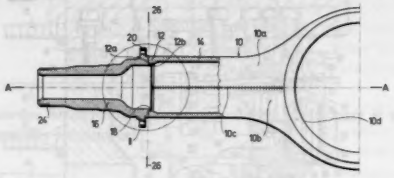
means for shielding said first and second arcs in common with one another.

4,048,466

METHOD OF MANUFACTURING AXLE HOUSINGS WITH HOLLOW AXLES

Laszlo Toth; Janos Schirhuber; Kalman Prepost, and Andras Tassi, all of Gyor, Hungary, assignors to Magyar Vagon- es Gepgyar, Gyor, Hungary

Filed Nov. 6, 1975, Ser. No. 629,228
Claims priority, application Hungary, Nov. 23, 1974, MA 2620
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 EM **1 Claim**



1. In a method of manufacturing axle housings of sheet metal with hollow axles, the steps of:

forming a beaded edge on each side of a sheet metal axle housing by means of plastic deformation;

machining both the axle housing and the hollow axles so as to have mutually abutting front surfaces;

fitting the hollow axles each in one of the beaded edges of the axle housing along said mutually abutting front surfaces;

clamping the axle housing with the fitted in hollow axles in a clamping device;

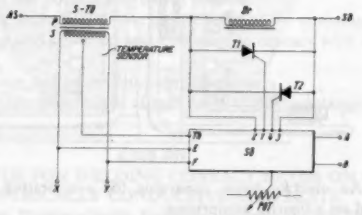
and connecting the hollow axles with the axle housing along said mutually abutting front surfaces by means of electron beam welding.

4,048,467

APPARATUS FOR GENERATING AND REGULATING WELDING CURRENTS

Josef Wertli, Zufikon, and Paul Matter, Muri, both of Switzerland, assignors to Firma WkS-Schweisstechnik Willy Kalnbach, Aalen, Switzerland

Filed Jan. 8, 1976, Ser. No. 647,647
Int. Cl.[2] B23K 9/10
U.S. Cl. 219—131 R **8 Claims**



1. Apparatus for generating and regulating high intensity welding currents which are developed in a welding apparatus having electrodes which are brought in contact with a workpiece comprising:

a. a transformer having a primary winding and a secondary winding, the welding current which is to be regulated being taken from across the secondary winding, said secondary winding being coupled to the electrodes;

b. a choke coupled in series with the primary winding across an a.c. power source;

c. first and second thyristors coupled in parallel with each other and in parallel with the choke and thyristors arranged so as to have opposite polarity;

d. variable phase triggering means for developing firing pulses for said thyristors to control the point in the positive and negative half cycles of the a.c. power at which they are fired, said triggering means including a first RC timing circuit having at least a resistor and capacitor in series; and

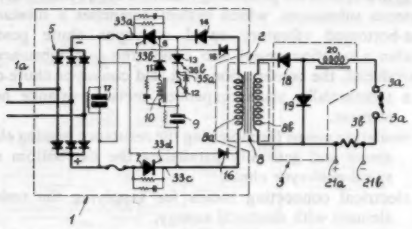
e. means associated with said variable phase triggering means for causing the firing pulse outputs thereof to be shifted in a direction to reduce the effective currents through the thyristors both during turn on of the apparatus and in the case of a short circuit of the secondary of the transformer, said means comprising a semiconductor switch coupled in parallel with said resistor in said first RC timing circuit, said switch having a control electrode, means coupled to the secondary of said transformers for generating a control signal when the voltage at said output is greater than a predetermined value, and a second RC circuit coupling said control signal to the control terminal of said semiconductor switch.

4,048,468

D.C. ARC WELDER WITH SOLID STATE COMPONENTS

Clemente Maule, Via C. Battisti, 6, Vicenza, Italy

Filed Oct. 21, 1975, Ser. No. 624,639
Claims priority, application Italy, Oct. 25, 1974, 41703/74
Int. Cl.[2] B23K *9/10*
U.S. Cl. 219—135 3 Claims



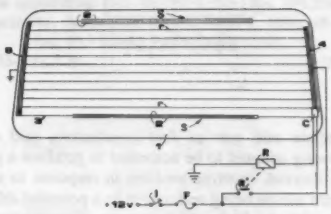
1. A.D.C. arc welder with solid state components, having two output terminals and means for generating an arc at said output terminals, said means including means for providing a direct current, a first electric path downstream of said direct current providing means, a transformer having a primary in series with said first electric path and a secondary connected to said output terminals through a second electric path, electronic switching means for causing a pulse train to be generated in said first electric path and in said primary, means for controlling said electronic switching means according to the tension and current conditions at said output terminals, and means for converting the pulse tension signal induced at said secondary by said pulse train in said primary into an unidirectional current signal, wherein said electronic switching means includes a first and a second controlled diode serially connected in said first electric path, one of said controlled diodes being connected upstream and the other downstream of said primary, a further controlled diode and a capacitor connected in series with respect to one another and in parallel with respect to said primary between said primary and said first and second controlled diodes, respectively, an inductance in series with said capacitor and in parallel with said further controlled diode, and wherein said means for controlling said electronic switching means includes a square wave generator providing a half-wave tension signal for simultaneously triggering said first and second controlled diode to become conductive and a half-wave tension signal for triggering said further controlled diode to become conductive, the triggering of said further controlled diode causing said first and said second controlled diodes to be turned off into the non-conductive state, said square wave generator generating a square wave having a period depending on the voltage and current at said output terminals.

4,048,469

AUTOMATIC CONTROL SYSTEM FOR A DEFOGGING CIRCUIT

Giorgio Ciarniello, Vasto, and Oscar De Lena, Termoli, both of Italy, assignors to Societa Italiana Vetro Siv S.p.A., Vasto, Italy

Filed Dec. 9, 1974, Ser. No. 531,098
Claims priority, application Italy, Dec. 12, 1973, 54277/73
Int. Cl.[2] H05B *1/02, 3/06;* E06B *7/12*
U.S. Cl. 219—203 6 Claims



1. In an automatic control system for a defogging circuit for a glass pane having a central viewing area and which includes a plurality of spaced generally parallel elongated linear heating resistors disposed on a surface of the central viewing area of the pane, the improvement comprising:

an electric power supply including a first bus and a second bus disposed on said surface of the pane laterally of said central viewing area and connected to said resistors for supplying current to said heating resistors, said buses extending generally transversely of said resistors;

a control circuit controllably connected between said power supply and said first and second buses for controlling the supply of current thereto, said control circuit comprising a miniaturized unit mounted in the immediate vicinity of a corner of the pane away from the viewing area and having a control input terminal means; and

a plurality of electrically conductive, moisture-sensing probes spaced apart from each other and said central viewing area at widely spaced zones on the glass pane, at least one of said probes including a conductive member having a portion running substantially parallel to and closely spaced from one of said buses, each of said probes having a portion running substantially parallel to said heating resistors of the defogging circuit, said probes each having a length, exclusive of said portion parallel to said bus, approximately the length of said heating resistors, each of said probes being sensitive to fogging of the glass pane in its immediate vicinity and having a signal output means upon which a signal appears upon occurrence of a given level of fogging, said control input terminal means of said control circuit being connected to each of said probes for receiving signals therefrom for enabling said control circuit to supply current to said heating resistors from said power supply in response to detection of fogging of said pane by any one of said probes.

4,048,470

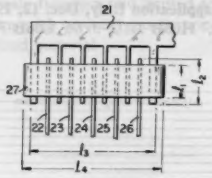
EXOTHERMIC PRINTING HEAD

Takemasa Shindo, and Kenichiro Arai, both of Shiojiri, Japan, assignors to Shinshu Seiki Kabushiki Kaisha and Kabushiki Kaisha Suwa Seikosha, both of Tokyo, Japan

Filed Sept. 23, 1975, Ser. No. 615,864
Claims priority, application Japan, Sept. 30, 1974, 49-112484
Int. Cl.[2] H05B *1/00*
U.S. Cl. 219—216 9 Claims

1. An improved exothermic printing head for thermally recording a printing character on a thermally sensitive medium comprising a substrate, a first conductor means mounted on said substrate, said first conductor means including at least one

pair of commonly referenced conductors, second conductor means mounted on said substrate and including a second conductor disposed intermediate each pair of commonly referenced first conductors, and exothermic means overlying each said first pair of conductors and second conductor disposed



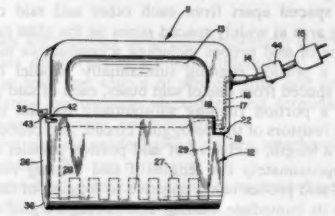
intermediate said pair of first conductors, said exothermic means being adapted to be activated to produce a pair of dots on said thermal sensitive medium in response to said second conductor means being referenced to a potential different than the potential at which said first pairs of conductors are commonly referenced.

4,048,471

ELECTRICALLY HEATED SPREADER ASSEMBLY HAVING A DETACHABLE BLADE

Frank M. Ours, P.O. Box 370, Parsons, W. Va. 26287

Filed June 11, 1975, Ser. No. 585,749
Int. Cl.[2] H05B *1/00*; B05C *17/10*
U.S. Cl. 219—228 **9 Claims**



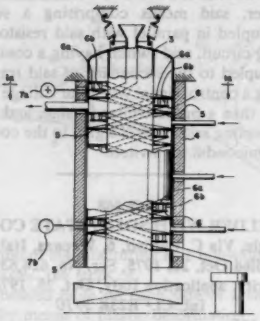
1. A spreader assembly comprising an elongated handle unit having a longitudinal edge and containing electrical contact means attached to means for connecting the same to a source of power and an elongated electrically heated spreader blade unit detachably mounted on said handle unit, said handle unit having slide means along said longitudinal edge, said blade unit having a pair of opposite longitudinal edges, said blade unit having along one longitudinal edge a smooth surfaced spreading and smoothing region laterally tapering to a minimum thickness at said one longitudinal edge and along the opposite longitudinal edge slide means providing an interfitting slide connection with the slide means of the handle unit for detachably coupling said units together and said blade unit having an imbedded electrical heater element connected to contacts positioned on the blade unit so as to engage with the contacts on said handle unit when the blade unit has been slidably mounted in operative position on said handle unit with the slide means of said handle unit and blade unit interfittingly connected.

4,048,472

VIBRATORY SPIRAL CONVEYOR CHUTE AND A RESISTANCE HEATING ELEMENT

Hans Sauer, Idstein-Walsdorf, and Thomas Czerny, Fischbach, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed May 17, 1976, Ser. No. 686,992
Claims priority, application Germany, May 17, 1975, 2522152
Int. Cl.[2] F27D *11/02*
U.S. Cl. 219—388 **4 Claims**



1. In a system for producing reactions between powdery and gaseous substances, which system comprises a substantially flat-bottomed vibratory spiral conveyor chute postioned within a reaction vessel into which the said substances are introduced, the combination with said conveyor chute of

a substantially planar expanded metal resistance heating element,

insulating means for mounting the resistance heating element above and generally paralleling the flat bottom of the spiral conveyor chute,

electrical connecting means for supplying the resistance element with electrical energy,

portions adjacent the expanded metal body which are of unexpanded metal, and

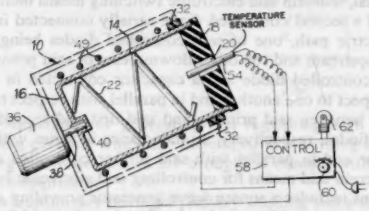
said connecting means comprising electrical connections from the outside of the reaction vessel to said unexpanded portions.

4,048,473

FOOD COOKING MACHINE

William H. Burkhart, Room 190, 960 San Antonio Road, Los Altos, Calif. 94022

Filed Apr. 17, 1975, Ser. No. 568,864
Int. Cl.[2] H05B *1/02*; A47J *27/00*; B01F *9/00*; F27B *7/08*
U.S. Cl. 219—389 **13 Claims**



1. A general purpose food cooking machine comprising a food-receiving vessel closed at one end, open at the opposite end, and having liquid-impervious walls, said vessel having a removable cap for closing said open end, and said cap being liquid-impervious except for a central vent opening therethrough through which gases may escape from the interior of

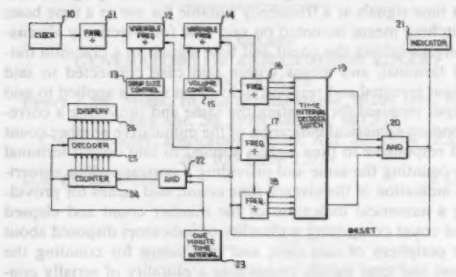
the vessel, a base having means for detachably receiving and supporting said vessel for rotation about an axis of rotation substantially aligned with said vent opening and oriented between horizontal and an acute angle to horizontal, and with the capped end of said vessel at least as elevated as the first-mentioned vessel end, said base having a drive train thereon engageable with said vessel for rotating said vessel about said axis of rotation when the vessel is supported on said base, heater means supported adjacent to and exterior to said vessel and operatively associated therewith for applying heat to contents of said vessel through the walls thereof when said vessel is supported for rotation on said base, and temperature controller means operatively connected to said heater means for controlling said heater means to vary the temperature in said vessel, said temperature controller means having and being responsive to a temperature sensor, said sensor having means for supporting the same on said base substantially in alignment with said vent opening in such a manner that said vent opening is not blocked and rotation of the vessel is not impeded, said sensor being so positioned relative to said vent opening as to sense the temperature of gases which escape from said vessel through said vent opening while said vessel is rotated.

4,048,474

METHOD AND APPARATUS FOR TIMING INTRAVENOUS LIQUID DRIP RATE

Ole V. Olesen, 615 Burley Road, Annapolis, Md. 21401

Filed Jan. 14, 1976, Ser. No. 648,882
Int. Cl.[2] G06F *15/42*; H03K *3/78*
U.S. Cl. 235—151.34 **7 Claims**



1. Electronic apparatus for monitoring the rate of drop flow of liquid into the drip chamber of an intravenous set, said apparatus comprising:

means for providing a train of clock pulses at a known pulse frequency;

programmable frequency divider means connected to receive and count pulses in said pulse train and provide an output pulse after a controllable number of pulses from said pulse train have been counted, said controllable number being selectively variable;

first operator-controlled means, connected to said programmable frequency divider means and calibrated in drops per unit volume of liquid, for selectively varying said controllable number;

second operator-controlled means connected to said programmable frequency divider means and calibrated in volume, for selectively varying said controllable number;

third operator-controlled means, connected to said programmable frequency divider means and calibrated in time, for selectively varying said controllable number; and

indicator means, connected to receive each output pulse from said programmable frequency divider means, for providing a momentary indication in response to each said output pulse;

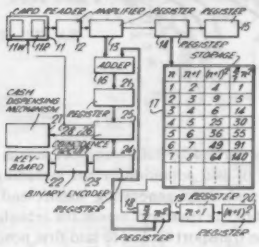
whereby, upon setting said first means to correspond to the desired drop size, the second means to correspond to a specified quantity of liquid to be delivered, and the third means to correspond to the desired time period over which said specified quantity of liquid is to be delivered, an operator can compare the repetition rate of said momentary indication with said rate of drop flow of liquid and adjust the latter as desired.

4,048,475

APPARATUS FOR CHECKING THE USER OF A CARD IN CARD-ACTUATED MACHINES

Shinya Yoshida, Takatsuki, Japan, assignor to Omron Tateisi Electronics Company, Kyoto, Japan

Continuation of Ser. No. 553,568, Feb. 27, 1975, abandoned.
This application Oct. 26, 1976, Ser. No. 735,276
Claims priority, application Japan, Mar. 7, 1974, 49-26964
Int. Cl.[2] H04Q *1/30*; G06K *7/00*
U.S. Cl. 235—61.7 B **20 Claims**



1. A system for checking the user of a card having recorded thereon coded information including at least a first and a second code, wherein said first code is representative of the number of times of use of said card in said system, said system comprising: means for reading said codes; means responsive to said first code read by said reading means to produce a third code, said third code having a predetermined mathematical relationship with said first code; means operated by the user of said card to enter a card owner code; computational means responsive to said reading means and said means for producing said third code for mathematically combining said second code with said third code, said computational means including coincidence checking means for comparing said entered card owner code with said mathematically combined second and third codes, said coincidence checking means supplying a control signal when said entered card owner code corresponds to said mathematically combined second and third codes; and code changing means responsive to said control signal supplied by said coincidence checking means for changing both said first and second codes on said card, said code changing means increasing said first code by one and changing said second code such that said mathematically combined second and third codes will correspond to said card owner code the next time said card is used in said system.

4,048,476

CARD READER

Ray L. Lawter, Zanesville; Kenneth L. Shooter, Senecaville, and David C. Wills, Cambridge, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

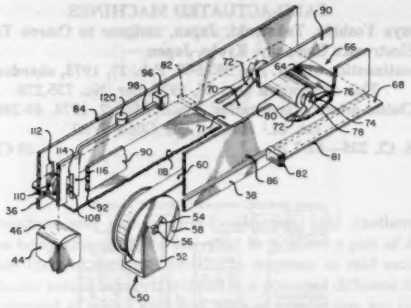
Filed Apr. 9, 1976, Ser. No. 675,395
Int. Cl.[2] G11B *25/04*; G06K *7/08*
U.S. Cl. 235—61.11 D **14 Claims**

1. Apparatus for reading a record member comprising means for supporting said record member for movement between a first and second position, a read station positioned between said first and second positions, and transport means engaging the record member and movable therewith between said first and second positions, the combination comprising:

a. stationary drag generating means extending between said first and second positions;

b. actuating means operatively associated with said transport

means and responsive to the movement of the transport means to said second position to move the transport means to said first position at a constant acceleration wherein the transport means will move the record member past the read station;



c. and means carried by said transport means for opposing the action of said actuation means including drag means engaging said drag generating means and actuated by movement of the transport means for retarding the movement of the transport means to said first position whereby the record member will move past the read station at a constant velocity.

4,048,477

WEIGHT CONTROL CALCULATOR

Daniel Comstock Hungerford, P.O. Box 14306, North Palm Beach, Fla. 33408

Filed Dec. 19, 1975, Ser. No. 642,595
Int. Cl.[2] G06C *3/00*
U.S. Cl. 235—88 R **4 Claims**

1. A hand-held weight control calculator comprising:

a first display surface having a peripheral edge, said first surface including a plurality of radially disposed indicia columns, each of said columns having an indicia weight range heading disposed near said first surface peripheral edge and a plurality of indicia rows within each column displaying daily intake calorie values as a function of weight range, frame size and activity level; and

a second display surface having an observation aperture sized to display a single indicia column on said first display surface, said second display surface including rows of indicia displaying individual activity levels along one side of said observation aperture; and

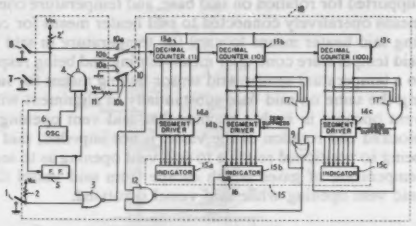
first registration indicia for selectively registering said second display surface observation aperture with a particular column on said first display surface.

4,048,478

MARKING APPARATUS WITH ELECTRONIC COUNTERS

Akihoro Miwa, Funabashi, and Shigemi Misono, Tokyo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed June 18, 1975, Ser. No. 587,870
Claims priority, application Japan, June 18, 1974, 49-69509; June 22, 1974, 49-71579
Int. Cl.[2] G06M *3/08*
U.S. Cl. 235—92 T **5 Claims**



1. An apparatus for selectively counting events or timing elapsed time comprising: an elongated case configured and sized to be manually held by a person during use of the apparatus; means including an actuatable push-button switch at one end portion of said case for developing a count signal in response to each depression of said push-button switch; means within said case including an oscillator for developing continuous time signals at a frequency suitable for use as a time base; switching means mounted on said case for selectively alternatively switching the count and time signals to a common output terminal; and means within said case connected to said output terminal and responsive to count signals applied to said output terminal for counting the same and providing a corresponding numerical indication of the cumulative number count and responsive to time signals applied to said output terminal for counting the same and providing a corresponding numerical indication of the elapsed time count, said means for providing a numerical indication of the number count and elapsed time count comprising a plurality of indicators disposed about the periphery of said case, and said means for counting the count and time signals comprising a plurality of serially connected decimal counters, and a plurality of drivers each connected to receive the output of respective ones of said decimal counters and operative to generate driving signals corresponding to the outputs of the decimal counters and apply the driving signals to said plurality of indicators.

4,048,479

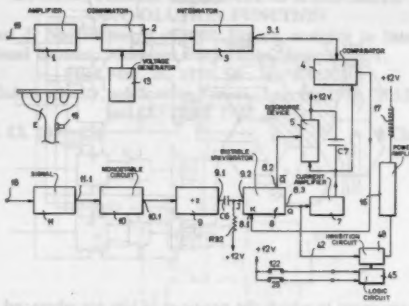
OPTIMUM AIR/FUEL MIXTURE COMPUTER FOR INTERNAL COMBUSTION ENGINES

Jean-Pierre Rivere, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed May 28, 1976, Ser. No. 691,209
Claims priority, application France, May 29, 1975, 75.16751
Int. Cl.[2] F02M *7/00*; G06G *7/70*
U.S. Cl. 235—150.21 **9 Claims**

1. In a computer for calculating the optimum mixture of combustion agent and fuel for an internal combustion engine, of the type comprising a monostable univibrator operating in synchronism with the rotational velocity of the engine and generating electric pulses of a width subordinate to the value of the voltage measured by a probe for making the chemical analysis of the gases in the exhaust manifold, the thus measured voltage being processed in a regulator provided with an intermediate integrator, said electric pulses being utilised for determining the opening time of a solenoid valve controlling the output of a fluid, whether combustion agent or fuel, of which the metering is measured by said probe, provision is made of a

bistable univibrator coupled at one end to the output of a first comparator having one input connected to said chemical analysis probe via an integration type regulating circuit, said univibrator being connected at its other input to a pulse generator operating in synchronism with the rotational movement of the



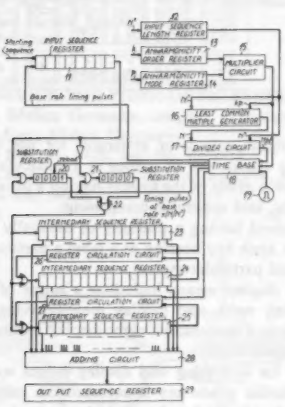
engine, by one of its outputs to an integrator comprising a current amplifier in series with a capacitor and connected to the second input of said first comparator, said one output being also connected to the device controlling the opening time of said solenoid valve, and by its other output to one input of a discharge device for said capacitor.

4,048,480

GENERATORS OF ANHARMONIC BINARY SEQUENCES

Pierre J. M. Minot, 10, rue Monmousseau, 94200 Ivry, France

Filed Apr. 30, 1976, Ser. No. 681,911
Claims priority, application France, Apr. 30, 1975, 75.13691
Int. Cl.[2] G06F *15/34*
U.S. Cl. 235—152 **6 Claims**



1. A generator of anharmonic binary sequences having N bits and harmonics of orders $k_1, k_2 \ldots k_m$ equal to zeros according respectively to modes $p_1, p_2 \ldots p_m$ derived from a starting anharmonic binary sequence having N′ bits and harmonics of orders $k_1, k_2 \ldots k_{m-1}$ equal to zeros according respectively to modes $p_1, p_2 \ldots p_{m-1}$, said generator comprising:

a. means for computing a number N equal to the least common multiple of the number N′ and the product $k_m p_m$;

b. means for deriving from the starting anharmonic binary sequence with N′ bits an intermediary binary sequence by substituting each one bit of the starting sequence by a one bit followed by (N/N′)−1 zero bits and each zero bit of the starting sequence by N/N′ zero bits;

c. means for shifting said intermediary binary sequence successively by $N/k_m p_m$, $2(N/k_m p_m) \ldots (p_m-1)(N/k_m p_m)$ bits, thereby obtaining (p_m-1) shifted binary sequences; and

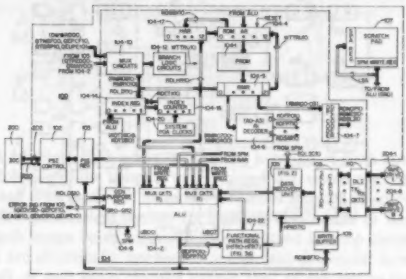
d. means for adding p_m binary sequences, said p_m binary sequences being said (p_m-1) shifted binary sequences and said intermediary binary sequence.

4,048,481

DIAGNOSTIC TESTING APPARATUS AND METHOD

Myrl Kennedy Bailey, Jr., North Billerica, and George J. Barlow, Tewksbury, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 17, 1974, Ser. No. 533,743
Int. Cl.[2] G06F *11/04*
U.S. Cl. 235—153 AK **30 Claims**



1. An improved input/output magnetic tape controller having microprogrammed processing means and data recovery means for assembling into bytes for transfer to a data processing system, digital signals received from a magnetic tape device obtained by reading signals arranged in a predetermined block format and recorded on a multichannel magnetic medium, said recovery means including a plurality of registers for deskewing said digital signals and assembling them into bytes, correction circuits coupled to different ones of said registers for correcting errors detected during said deskewing, a plurality of checking circuits coupled to different ones of said registers for detecting different types of error conditions occurring during said deskewing and assembling of said digital signals and a plurality of error indicator circuits coupled to said checking circuits, said controller further comprising:

a control store having a plurality of resident basic logic test routines, one of said routines for verifying the operation of said data recovery means, said one routine including a plurality of constants representative of initial patterns and expected result patterns;

decoder means for generating control signals in response to decoding microinstructions of said resident basic logic test routines;

selector circuit means coupled to said processing unit to said magnetic tape device and to a first one of said plurality of registers, said selector circuit means being operatively connected to apply selectively digital signals received from said device and said processing means to said first one of said plurality of registers; and,

means coupling said plurality of error indicator circuits to said processing means;

said decoder means being conditioned by microinstructions of said one routine to generate signals for conditioning said selector circuit means to couple said first one of said registers to said processing means inhibiting transfer of said digital signals from said device, other microinstructions of said one routine conditioning said decoder means to generate signals for conditioning said processing means to generate digital signals of a first block from said initial patterns arranged in said predetermined format and said

decoder means being conditioned by a sequence of test microinstructions at the completion of said recovery unit having assembled all of said digital signals of said first block into bytes to compare the states of said error indicator circuits with one of said expected result patterns for verifying that said recovery unit is operating properly.

4,048,482

ARRANGEMENT FOR CONTROLLING A SIGNAL SWITCHING SYSTEM AND A METHOD FOR USING THIS ARRANGEMENT

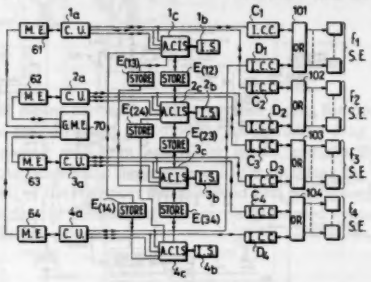
Pierre Charransol; Jacques Hauri, and Roger Danis, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Feb. 23, 1976, Ser. No. 660,676

Claims priority, application France, Feb. 25, 1975, 75.05800

Int. Cl.² G06F *11/00*; H04Q *3/42*

U.S. Cl. 235—153 AE **4 Claims**



1. A control arrangement for a switching system comprising:

n control units each including an independent store (*n* integer greater than 2);

p groups of switching elements connected to said control units, each group capable of performing one of *p* functions (*p* integer greater than 2);

$\frac{n(n-1)}{2}$ exchange stores of smaller capacity than the independent store;

and means for coupling each exchange store to a predetermined pair of control units so as to have each control unit capable to perform at least two predetermined functions.

4,048,483

DATA HANDLING SYSTEMS

Albert Brian Keats, Dorchester, England, assignor to United Kingdom Atomic Energy Authority, England

Filed July 23, 1976, Ser. No. 708,020

Claims priority, application United Kingdom, July 25, 1975, 31269/75; May 7, 1976, 18705/76

Int. Cl.² G06F *11/00*

U.S. Cl. 235—153 A **6 Claims**

1. A date handling system comprising

a scanning means for scanning a number of analogue signals from independent input lines, cyclicly

a test signal injection means by which test signals are interleaved between at least two of said number of analogue signals,

an analogue to digital converter means receiving said analogue signals and said test signals and delivering equivalent digital output signals,

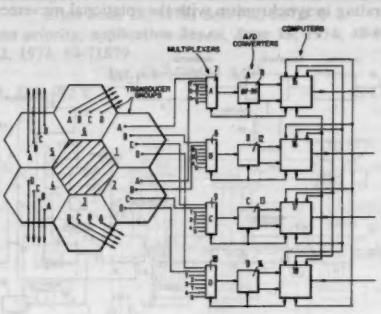
a primary measurement shift register (PMR) connected to receive said digital output signals and operable to overwrite or recycle said digital signals after each complete scan made by the scanning means with freshly scanned signals,

signal extraction means for extracting signals from the shift register (PMR),

comparator means for receiving extracted signals and comparing them with stored threshold data to yield a binary 1 or 0 according to the value of each extracted signal relative to said threshold data,

a primary status register (PSR) in which the digital bits yielded by the comparator means are assembled as a binary word in which the positions of bits are advanced by one space on each cycle of the scanning means and

a majority voting circuit responsive to a majority *m* out of *n* status bits indicating an out of tolerance condition.



4,048,484

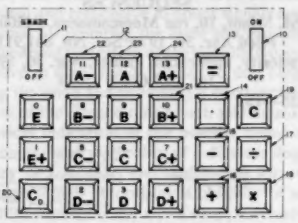
DIGITAL GRADE AVERAGER

John L. Brittan, 1113 Brunn Ave., St. Joseph, Mich. 49085

Filed Apr. 26, 1976, Ser. No. 680,223

Int. Cl.² G06F *15/02, 15/20*

U.S. Cl. 235—156 **16 Claims**



1. A digital calculator apparatus for use by teachers for averaging a sequence of grades in a particular letter grading system, each grade of the system having a preassigned numerical weight, said apparatus comprising:

a keyboard having a plurality of manually operable grade keys, each key bearing as a label a particular letter grade in said particular system;

digital display means including a series of discrete signal display units, said display means having a letter grade section, a numerical weight display section and a number of inputs section;

means for activating said display means such that when a particular grade key is actuated the particular grade of that key is displayed on said letter grade display section, the numerical weight assigned that particular grade is displayed on said numerical weight display section and the cumulative number of grade keys which have been actuated in that particular sequence is displayed on said number of inputs section;

means for summing the numerical weights of all the particular grade keys which have been actuated in a particular sequence;

means for dividing said sum of numerical weights by said cumulative number to arrive at an average numerical weight; and

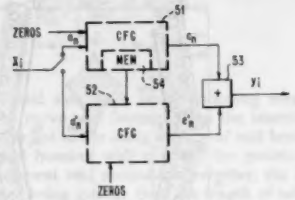
means for decoding said average numerical weight to deterine its letter grade equivalent and for displaying said letter grade equivalent on said letter grade display section.

4,048,485

DIGITAL FILTER GENERATING A DISCRETE CONVOLUTION FUNCTION

Henri J. Nussbaumer, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,325
Claims priority, application France, Apr. 16, 1975, 75.12557
Int. Cl.² G06F *7/38, 15/34*
U.S. Cl. 235—156 **8 Claims**



5. A digital filter with filtering coefficients $\{b_n\}$ characterized in that it includes:

a first means for separating the input signal samples into blocks of $2p$ samples;

a pair of second means each for appending a sequence of $2p$ consecutive zeroes to alternate blocks of $2p$ samples;

a third means including a pair of convolution functions generators, each connected to one of said second means to receive therefrom alternate ones of said blocks of $2p$ samples with an appended sequence of zeroes and forming a sequence of terms representing a convolution of said blocks of samples with appended zeroes; and

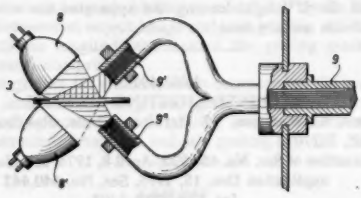
a fourth means connected to both said convolution function generators of said third means to add sequentially the terms provided by said function generators.

4,048,486

LIGHTING DEVICE FOR FIBER-OPTIC SYSTEMS

Wolfgang Kriege, Mainz, Germany, assignor to Jenner Glaswerk, Schott & Gen., Mainz, Germany

Filed Nov. 10, 1975, Ser. No. 630,623
Claims priority, application Germany, Nov. 22, 1974, 2455333
Int. Cl.² G02B *5/16*; F21S *1/14*
U.S. Cl. 240—1 R **10 Claims**



1. A device for illuminating a fiber-optical system comprising

a. two light sources having broadly directed beams, each beam having an optical axis, the light sources arranged with respect to each other such that the optical axes of the beams intersect at a cross point,

b. two light entrances to a fiber-optical system aligned with the optical axes of the light sources each located on the opposite side of the cross point from one of the sources, and

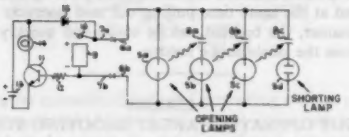
c. a beam splitting mirror arranged in the region of the cross point for dividing the impinging light beam from each of the light sources into two segments such that two of said segments, one from each of the two light sources, are coincident upon one of said two light entrances.

4,048,487

LAST-FLASH INDICATOR SWITCH IN PHOTOFLASH ARRAY

Norman E. Kewley, Pepper Pike, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Sept. 8, 1976, Ser. No. 721,202
Int. Cl.² G03B *15/02*
U.S. Cl. 240—1.3 **6 Claims**



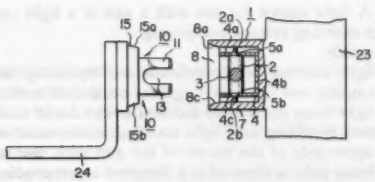
1. A multiple flash array comprising a group of flash lamps of which one of the lamps is to be flashed last, said array being provided with a pair of connector terminals adapted to receive lamp-firing electrical signals for causing said lamps to flash, said flash lamps being respectively connected in lamp circuits which are electrically connected across said connector terminals, all of said lamp circuits except that of the last-to-flash lamp being adapted to have open circuits or high impedances after their lamps are flashed, and said lamp circuit of the last-to-flash lamp being adapted to have a short circuit or low impedance after the lamp is flashed.

4,048,488

COUPLING DEVICE IN A STROBOSCOPE HOLDER WITH A REMOVABLE BRACKET

Michio Kawazoe, 30-11 5 chome, Narita Higashi, Suginami, Tokyo, Japan

Filed Nov. 7, 1975, Ser. No. 629,714
Claims priority, application Japan, June 23, 1975, 50-86807
Int. Cl.² G30B *17/56*
U.S. Cl. 240—1.3 **3 Claims**



1. In a stroboscope holder with a removable bracket wherein the bracket is attached to the stroboscope holder through a coupling device, said coupling device comprising:

a. retainer including

a joint bar with a push rod perpendicular thereto,

a guide plate with a channel section comprising top, side, and bottom parts,

a pair of slots in the top and bottom parts of said guide plate carrying said joint bar, said slots extending with their longer dimension parallel with the side part of said guide plate and engaging said joint bar near both its ends,

a spring with one end fixed at an area outside an extremity

of said slot in the top part of said guide plate and the other end attached to said joint bar, and

a box with an opening therein, said guide plate being mounted with the side part of said guide plate plate fixed on a bottom thereof,

said retainer being mounted on the stroboscope holder; and

b. an insertion mounted on the bracket, said insertion comprising:

a solid body having a recess adapted to receive said joint bar, a guide slope in front of, and in communication with, said recess, for guiding said joint bar into said recess, and a channel for permitting the passage of said push rod into the solid body as the joint bar moves into the recess, and

whereby by inserting said insertion into said retainer, the bracket can be easily and quickly attached to the stroboscope holder in one motion, and by pushing said push rod and at the same time pulling out said insertion from said retainer, the bracket can be easily and quickly removed from the stroboscope holder.

4,048,489

LIGHT OPERATED TARGET SHOOTING SYSTEMS

Carlo Giannetti, 541 Dorothy Drive, Fullerton, Calif. 92631

Filed Nov. 10, 1975, Ser. No. 630,091

Int. Cl.² F41G *3/26*; F41F *27/00*

U.S. Cl. 240—6.41 **13 Claims**

1. A light source for use with a gun in a light responsive target shooting system, comprising:

a switch;

a light emitting semi-conductor and operating means for causing said light emitting semi-conductor to discharge a light beam pulse as an incident to closure of said switch;

means for fixing said light emitting semi-conductor to the upper side of the barrel of the gun such that said light beam pulse is directed in a direction corresponding to that in which said gun is pointed; and

means for closing said switch in response to a movement of said gun corresponding to recoil movement.

12. In a target shooting system, in combination:

a gun having a barrel;

a gun sight holder mounted on said gun and extending along said barrel from a forward end to a rearward end;

said gun sight holder being formed with an inner cavity and a bore extending from said cavity substantially in the direction of said bore and opening at said forward end;

means within said cavity for generating a pulse of beamed light in response to a control signal and directing said pulse of beamed light through said bore to emerge in a direction substantially parallel with the axis of said barrel; and

means for developing said control signal.

4,048,490

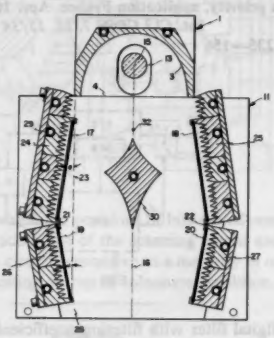
APPARATUS FOR DELIVERING RELATIVELY COLD UV TO A SUBSTRATE

Harden Henry Troue, Plainfield, Ind., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 11, 1976, Ser. No. 694,972

Int. Cl.² 250/504, F21V *7/12*

U.S. Cl. 240—41.35 D **2 Claims**



1. Apparatus for providing a high flux beam of substantially all ultraviolet light to a substrate comprising

an elliptical-like reflector housing having an opening at one end and a first focal line;

a linear source of UV light mounted in said housing at the focal line thereof, the longitudinal axis of the line source being contained in a plane of symmetry of the apparatus which is perpendicular to the plane of the opening of said reflector housing;

a first optically flat dichroic surface on each side of said plane of symmetry mounted at one end of such dichroic flat surface adjacent said reflector housing opening;

a second optically flat dichroic surface on each side of said plane of symmetry connected to the other side of said first dichroic flat surface, said first and second dichroic flat surfaces providing a concave surface on each side of said plane of symmetry when viewed therefrom;

a cusp-like member mounted between said concave surfaces so that its longitudinal plane of symmetry coincides with the plane of symmetry of the apparatus and so that the cusp-like member is adjacent the reflector opening beyond the second focal line of said reflector housing

whereby substantially all the UV light from said line source strikes a dichroic surface only once and and substantially all the UV light leaving the apparatus has struck a dichroic surface once.

4,048,491

RECESSED LIGHTING FIXTURE

Leonard A. Wessman, 12 Harbison Circle, Rancho Mirage, Calif. 32270

Continuation of Ser. No. 458,932, April 8, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,442

Int. Cl.² F21S *1/02*

U.S. Cl. 240—78 H **3 Claims**

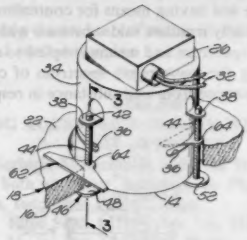
1. Apparatus for mounting a recessed lighting fixture to a wall member having a first side which defines a room surface and a second side which defines an interior surface comprising:

a lighting fixture housing having a side wall, said side wall having an inner surface and an outer surface;

a first generally planar tab member and a second generally planar tab member having surfaces spaced apart in parallel planes intersected by said side wall and secured to said lighting fixture housing;

a slot formed in said housing side wall in a plane parallel to the planes of said surfaces of said tab member;

a positioning means secured between said tab members and having a generally planar fastener secured thereto, said fastener being mounted in a plane perpendicular to said



surface of said side wall, said positioning means being rotatable to move said fastener from the interior of said housing adjacent to the outer surface of said housing wall through said housing wall slot and for positioning said fastener adjacent said second tab member, the length of said fastener being greater than the length of said slot.

4,048,492

METHOD AND APPARATUS FOR AUTOMATIC FOCUSING AN OPTICAL SYSTEM WITH A SCANNING GRATING

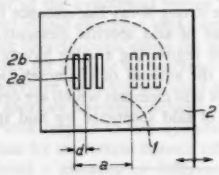
Horst Hartmann, Nauborn, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany

Filed June 14, 1976, Ser. No. 695,916

Claims priority, application Germany, June 26, 1975, 2528515

Int. Cl.[2] G01J *1/20*

U.S. Cl. 250—201 **2 Claims**



1. In a method for automatically focusing an optical system, comprising locating a grating in the intermediate image plane, said grating defining a spatial frequency filter, associating a photoelectric detection system with said grating, generating electrical control signals which are modulated by the relative motion between an object image and said grating, said motion normal to the longitudinal range of the grating marks, the improvement comprising:

using a grating (2) which is short compared to the range of the intermediate image and generating relative motions extending across several grating constants between said intermediate image (1) and said grating (2).

4,048,493

LIGHT-SENSITIVE CONTROL FOR COLORED LIGHT PROJECTOR

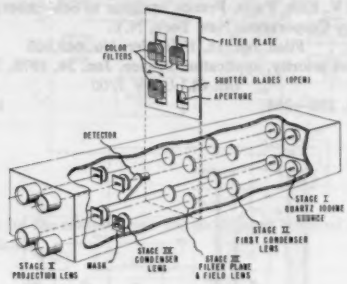
Jerald Dana Lee, Mendenhall, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 3, 1976, Ser. No. 711,407

Int. Cl.[2] G01J *1/32*

U.S. Cl. 250—205 **31 Claims**

1. A device for producing variable colors from projected white light comprising (1) an adjustable color filter having at least two primary-color areas upon which a portion of said projected white light is incident, (2) individually actuatable light-attenuation means which attenuates the quantity of light transmitted from each of the primary-color areas as well as the portion of the projected light which is transmitted unfiltered, and (3) control means comprising (a) a lightmeasuring unit for



measuring the transmitted light and generating a signal proportional to the amount of light measured, (b) means responsive to said signal to determine the quantity of each component of transmitted light present and (c) means responsive to (b) for controlling each of the light-attenuation means.

4,048,494

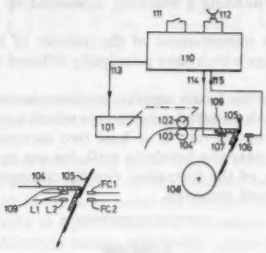
DEVICE FOR TAKING PIECES OF MATERIAL STUCK TO A SUBSTRATE WOUND ON A REEL

Bernardus G. Liesting, Aalsburg 1214, Wijchen, Netherlands

Filed Dec. 12, 1975, Ser. No. 640,208

Int. Cl.[2] B65C *9/42*

U.S. Cl. 250—223 R **18 Claims**



1. A device for removing adhesive labels or the like from a substrate comprising:

a reel on which said substrate is wound;

means for mounting said reel for rotation about an axis of rotation;

a housing having a trough in which said reel is mounted with an open upper end, said housing including a horizontal guide having a horizontal surface for supporting said substrate situated at a level higher than said axis of rotation, and a bending edge for the substrate at the end of said guide surface remote from said trough;

a light source disposed adjacent said bending edge;

driving means located below said guide surface for engaging said substrate to pull said substrate past said edge so as to separate one at a time said labels from said substrate;

a photo-electric cell disposed adjacent said bending edge for producing a given electrical signal indicating the presence of a separated label, when said label is located between said source and said cell; and

circuit means connected to said photo-electric cell for dis-

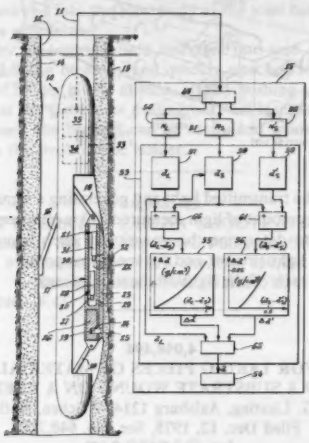
abling said driving means when said given signal is produced.

4,048,495

DOUBLY-COMPENSATED DUAL-DETECTOR DENSITY LOGGING APPARATUS

Darwin V. Ellis, Paris, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,865
Claims priority, application France, Jan. 24, 1975, 75.02206
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—264 **18 Claims**



1. A method for determining the density of a geological formation surrounding a borehole, irradiated by gamma rays, comprising:

producing a measurement of the number of backscattered gamma rays which have principally diffused in said formation; and

producing at least two separate measurements of the numbers of backscattered gamma rays which have principally diffused respectively in at least two successive layers of materials near the borehole wall, for use in obtaining an indication of the formation density compensated for the effect of said materials.

4,048,496

SELECTABLE WAVELENGTH X-RAY SOURCE, SPECTROMETER AND ASSAY METHOD

Richard D. Albert, 317 Hartford Drive, Danville, Calif. 94526

Continuation-in-part of Ser. No. 353,451, April 24, 1973, Pat. No. 3,925,660, which is a continuation-in-part of Ser. No. 251,378, May 8, 1972, abandoned. This application Nov. 20, 1975, Ser. No. 633,980
Int. Cl.[2] G01N *23/20*
U.S. Cl. 250—272 **3 Claims**

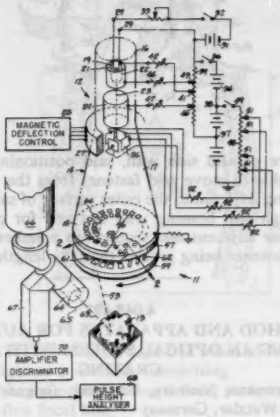
1. An X-ray fluorescence analysis spectrometer comprising:

an X-ray source having means for producing any selected one of a plurality of different specific predetermined X-ray spectra, said X-ray source having means for producing an accelerated charged particle beam and having at least one first primary target positioned to intercept said charged particle beam to produce primary X-rays in response to bombardment thereby and having a first plurality of spacedapart secondary targets each of different composition and means for directing said primary X-rays to any selected one of said secondary targets to produce secondary X-rays thereat which have different X-ray spectra at different ones of said secondary targets,

means for supporting a substance to be analyzed in position to receive said X-rays produced by said selected ones of said secondary targets,

an X-ray detector disposed for detecting characteristic fluorescent X-rays emitted from said substance in response to said irradiation thereof, and

a self-cycling system coupled to said detector and to said X-ray source and having means for controlling said X-ray source to initially irradiate said substance with a polychromatic X-ray spectrum and means coupled to said detector for analyzing the wavelength spectrum of characteristic X-ray fluorescence from said substance in response to said



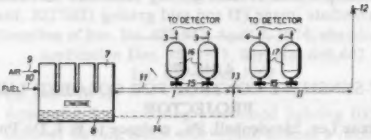
polychromatic irradiation thereof to indentify wavelengths characteristic of specific elements, said self-cycling system further having logic circuit means controlling said X-ray source to sequentially irradiate said substance with a plurality of specific X-ray spectra each selected to cause strong X-ray fluorescence from a particular separate one of said specific elements, and further having means for registering a value having a magnitude proportional to the amount of characteristic fluorescent X-rays of each of said elements which are detected during said irradiation of said substance by said specific X-ray spectra.

4,048,497

METHOD OF MEASURING THE OIL CONSUMPTION OF INTERNAL COMBUSTION ENGINES

Gerhard Fritzsche, Neuthard, Germany, assignor to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Apr. 9, 1976, Ser. No. 675,593
Claims priority, application Germany, Apr. 11, 1975, 2515960
Int. Cl.[2] G01T *1/161*
U.S. Cl. 250—303 **12 Claims**



1. A method for measuring the oil consumption of an internal combustion engine equipped with an exhaust gas line which carries an exhaust gas stream, comprising:

a. labelling the oil with a radioactive tracer;

b. taking at least one first sample from the exhaust gas stream

at a location which only carries activity coming from the oil consumption in the engine;

c. adding to the exhaust gas stream radioactively labelled oil corresponding to the oil in the internal combustion engine;

d. subsequently taking at least one second sample from the exhaust gas stream downstream of the point of addition of the oil, and

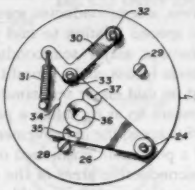
e. comparing the amounts of radioactive tracer present in the first and second samples.

4,048,498

SCANNING AUGER MICROPROBE WITH VARIABLE AXIAL APERTURE

Robert L. Gerlach, Minnetonka, and Paul W. Palmberg, Bloomington, both of Minn., assignors to Physical Electronics Industries, Inc., Eden Prairie, Minn.

Filed Sept. 1, 1976, Ser. No. 719,463
Int. Cl.² H01J *39/00*
U.S. Cl. 250—305 **14 Claims**



1. In a single pass scanning Auger electron analyzer wherein Auger electrons emitted from an irradiated sample pass through a cylindrical mirror analyzer and are analyzed and focused at the axis of the cylindrical mirror analyzer to be detected, the improvement comprising a support member mounted transverse to and extending across the diameter of the inner cylinder of the cylindrical mirror analyzer adjacent to the focus point of said electrons, said support member defining a first opening therethrough along the axis of the cylindrical mirror analyzer for passage of analyzed electrons, a variably sizable exit aperture assembly mounted to said support member, said exit aperture assembly including plate means movable transversely with respect to said cylindrical mirror analyzer, said plate means by movement thereof relative to said support member defining a plurality of different size openigs therethrough in axial alignment with the openins in said support member, and control means external to said cylindrical mirror analyzer including linking means operatively joined to said plate means for moving said plate means relative to said support member.

4,048,499

INFRARED ABSORPTION SPECTROSCOPY OF LIQUIDS EMPLOYING A THERMAL DETECTOR

Lloyd B. Kreuzer, San Francisco, Calif., assignor to Diax Corporation, Sunnyvale, Calif.

Filed Feb. 20, 1975, Ser. No. 551,270
Int. Cl.² G01J *1/00*
U.S. Cl. 250—344 **14 Claims**

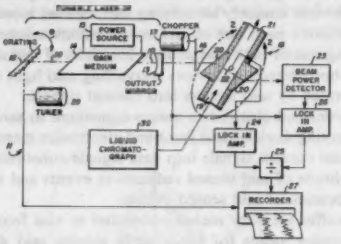
1. In a laser infrared absorption apparatus:

cell means for interposing a liquid sample medium to be analyzed in a beam of infrared radiation;

laser means for producing the beam of infrared radiation as a beam of coherent infrared radiation;

means for modulating the intensity of the beam of coherent infrared radiation; and

thermal detection means disposed in heat exchanging relation with the liquid sample and being responsive to the temperature of the liquid sample for detecting the heating effect at the modulation frequency or harmonics thereof in the liquid sample due to the absorption of infrared radiation by the sample from the modulated beam of infrared radiation.

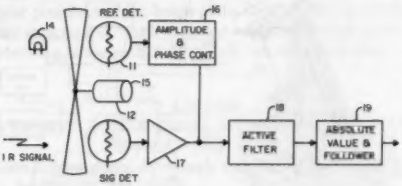


4,048,500

INFRARED BACKGROUND SUPPRESSION

Kenneth L. Moore, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 8, 1976, Ser. No. 739,916
Int. Cl.² G01N *23/00*
U.S. Cl. 250—350 **9 Claims**



1. An infrared analyzer of the signal-and-reference type employing separate detectors for the reference and signal beam comprising:

a single shutter positioned in the field of view of said detectors and driven to interupt the infrared energy reaching the detectors so as to cause the outputs thereof to vary alternatively at a predetermined frequency;

signal combination means effectively connected to the detectors for subtractively combining the detector outputs and for limiting the output to the shutter predetermined frequency; and

signal conversion means connected to said signal combination means for altering the signal to a D.C. analog of the signal intensity.

4,048,501

METHOD AND APPARATUS FOR DETERMINING THE CONDITION OF A BIOLOGICAL SPECIMEN

Raymond P. Grenier, Wilmington, Mass., assignor to Baird-Atomic, Inc., Bedford, Mass.

Filed Jan. 14, 1976, Ser. No. 649,071
Int. Cl.² G01T *1/20*
U.S. Cl. 250—367 **9 Claims**

1. A high resolution radioactivity distribution detection system for determining the condition of a subject under diagnosis, the subject containing a diagnostic dose of a radioactive substance, said system comprising:

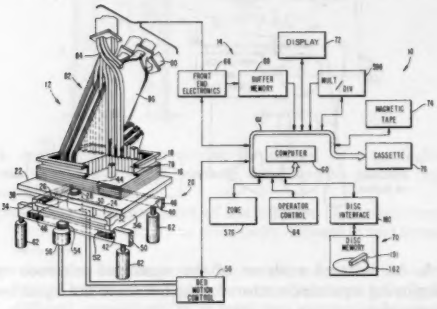
a. an array of sensors for detecting radioactive events within the subject, each said sensor having a unique address location within the array representing a unique spatial

segment of the subject, each said sensor generating a light signal when activated by a radioactive event;

b. a plurality of photo detecting devices optically coupled to said array, unique combinations of said photo detecting devices uniquely identifying said address locations of said sensors, each one of said combinations uniquely identifying one of each said address locations of said sensors, said photo detecting devices converting said light signals generated by said sensors into current signals;

c. front-end electronics means connected to said photo detecting devices, said front-end electronics means digitizing said current signals into data signals constituting the amplitude of said sensed radioactive events and said address location of said sensed events;

d. buffer memory means connected to said front-end electronics means for temporarily storing said data signals, said buffer memory means having address locations corresponding to said address locations of said sensors in said array, said data signals representing said sensed events temporarily stored in said buffer memory means at said corresponding address locations, said data signals representing said sensed events at any one address location accumulated to data signals representing said sensed events at the same address location in said buffer memory means;



e. a general purpose computer connected to said buffer memory means;

f. a disc interface connected to said computer

g. a disc memory means connected to said disc interface, said disc memory means including a disc for storing data signals and a head for writing said data signals onto said disc and for reading said data signals from said head, said disc storing also instructional data for control of said computer, said disc interface configured to transfer data from said computer to said disc memory and to transfer data from said disc memory to said computer; and

h. display means connected to said computer means for presenting said data stored in said disc memory, said display means controlled by said computer;

i. said computer generating command signals which are applied to said buffer memory means for transferring said data stored in said buffer memory means to said disc memory, said data sequentially transferred from said buffer memory means to said computer, then to said disc interface and finally to said disc memory;

j. said computer generating command for transferring said data stored in said disc memory to said display means for presentation, said data sequentially transferred from said disc memory to said disc interface, then to said computer and finally to said display means.

4,048,502

ELECTRO-OPTICAL TRANSDUCER

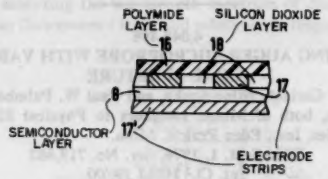
Friedrich Gudden, Erlangen, and Herbert Weiss, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 27, 1975, Ser. No. 608,323

Claims priority, application Germany, Sept. 4, 1974, 2442276

Int. Cl.[2] G01T *1/22*

U.S. Cl. 250—370 **4 Claims**



1. In a gamma-image tube having a vacuum chamber, a photocathode means positioned within said chamber and having an alkali metal therein, a semiconductor means positioned within said chamber in spaced relation to said photocathode means and so as to have a major semiconductive surface thereof facing said cathode means, and a plurality of electrode strips positioned at least on said major semiconductive surface of the semiconductor means so as to define a pattern of electrode-free semiconductive areas; the improvement comprising:

a layer composed of a polyimide positioned on at least said electrode-free semiconductive areas of the major surface of said semiconductor means facing said photocathode, said layer having a thickness of less than 5 μm.

4,048,503

RADIOGRAPHY WITH NOBLE GAS CONTAINING DETECTOR CELLS

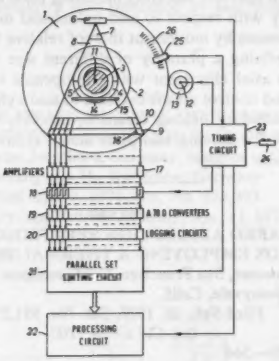
Stanley Taylor, Sunbury-on-Thames, England, assignor to EMI Limited, Hayes, England

Filed June 7, 1976, Ser. No. 693,317

Claims priority, application United Kingdom, June 10, 1975, 24904/75

Int. Cl.[2] G01T *1/18*; G01N *21/34*

U.S. Cl. 250—385 **11 Claims**



1. Radiographic apparatus comprising means defining a patient position, a source of penetrating radiation, such as X-radiation, arranged to project said radiation through said position along a plurality of substantially co-planar beam paths, means for scanning said source relative to said patient position so as to project said radiation through said position along further beam paths, detector means for detecting the radiation emergent from said position along said paths, including a plurality of cells containing a noble gas and means for sequentially

deriving, from each cell, output signals indicative of the amount of radiation emergent from said position along a respective group of said paths, said amount being indicated in each case by the number of electrons and ions of said gas generated by radiation projected through the position along the respective path, means being provided for periodically interrupting the incidence of said radiation upon said cells to provide for the clearance from each cell of ions generated by radiation projected through said position along one of said group of paths before the cell is exposed to the radiation projected through said position along the next path of its respective group.

4,048,504

METHOD AND APPARATUS FOR TREATING FLOWABLE MATERIAL

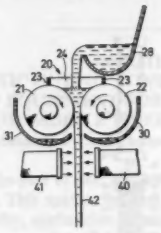
Ernst Bosshard, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 25, 1975, Ser. No. 552,982

Claims priority, application Switzerland, Dec. 23, 1974, 17237/74

Int. Cl.² G01N *23/12*

U.S. Cl. 250—434 **3 Claims**



1. An apparatus for treating a flowable material comprising

a pair of rollers defining a gap therebetween to form a flow of the flowable material passing in free fall from said rollers into a thin vertical layer, said rollers being counter-rotating to accelerate the flow of material in the direction of free fall prior to formation of said thin layer; and

at least one electron beam generator for directing an electron beam perpendicularly onto said layer below said rollers to form an irradiation zone, said generator moving said beam horizontally to and fro across said thin layer of falling material.

4,048,505

RADIOGRAPHY

Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

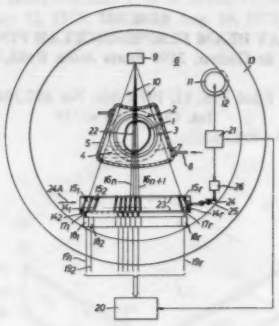
Continuation of Ser. No. 489,084, July 17, 1974, Pat. No. 3,934,142. This application Jan. 16, 1976, Ser. No. 649,595

The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.

Int. Cl.² G03B *41/16*

U.S. Cl. 250—445 T **2 Claims**

1. A medical radiographic apparatus for producing an image of the variation of absorption coefficient, with respect to penetrating radiation, over a slice disposed cross-sectionally in a patient's body, the apparatus including an angularly movable supporting structure having an opening to accommodate the part of the patient's body which contains said slice, a source of a fan-shaped spread of the penetrating radiation, supported by said structure at one side of said opening so as to project said radiation across said opening, a plurality of detectors, supported by said structure at the opposite side of said opening to said source, to receive radiation from said source after it has traversed said opening, said detectors being disposed to receive radiation from said source along respective beam paths diverging from said source and included within said fan-shaped spread of radiation, means for angularly moving said supporting structure, and with it said source and said detectors, about an axis intersecting said slice, through first and second substantial angles and for deriving a series of output signals from each detector during their movement through each of said substantial angles, each output signal being indicative of the radiation transmitted over a respective beam path and obtained whilst



said structure rotates through a relatively small angle, and means for causing the angular positions of the beam paths within said fan-shaped spread to be changed by a small amount relative to the structure for angular movement of said structure through said second substantial angle as compared with the angular positions of the beam paths for the angular movement of said structure through said first substantial angle to provide interleaving beam paths within said fan-shaped spread.

4,048,506

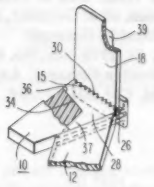
VERSATILE INTRAORAL RADIOGRAPHIC FILM POSITIONING SYSTEM

William J. Updegrave, Riverbend Apt. 603, 3010 N.E. 16th Ave., Ft. Lauderdale, Fla. 33334

Continuation-in-part of Ser. No. 542,073, Jan. 17, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,732

Int. Cl.² G03B *41/16*

U.S. Cl. 250—479 **44 Claims**



1. Apparatus for positioning dental x-ray film within the mouth comprising:

a bite block having a bite portion with an upper bite surface and a lower bite surface, a film-holding slot extending substantially vertically through said bite block at one end of said upper and lower surfaces so as to permit a film to extend through said block from a position above said upper bite surface to a position below said lower bite surface and a film-locking slot extending substantially horizontally through said bite portion between said upper bite surface and said lower bite surface and in communication with said film-holding slot;

a bite block holder means including a film-locking portion at one end thereof, said film-locking portion adapted to be removably received by said film-locking slot, said film-

locking portion adapted to engage the film and hold the film in one of a plurality of fixed positions extending above and/or below said upper and lower bite surface respectively; and

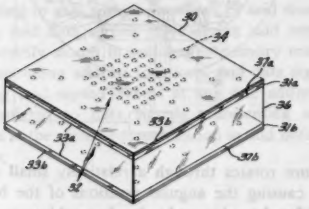
x-ray beam alignment means coupled to said bite block holder means for assisting in the alignment of an x-ray beam with the film in said film-holding slot.

4,048,507

X-RAY BEAM PERPENDICULAR FINDER

Alexis Neal de Gaston, 2190 Santa Anita Road, Norco, Calif. 91760

Filed Feb. 11, 1976, Ser. No. 657,164
Int. Cl.² G03B *41/16*
U.S. Cl. 250—491 **8 Claims**



1. A device for finding the location of the perpendicular ray of an X-ray beam field including:

first and second semi-radio opaque layers each defining a pattern therethrough removed therefrom, said pattern being defined by cutouts formed with edges perpendicular to said semi-radio opaque layers; and

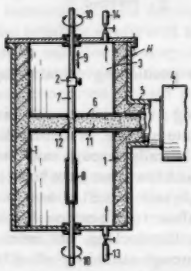
means to space and maintain said first and second semi-radio opaque layers in parallel alignment with their pattern in perpendicular registry, said means including a nonradio opaque member having parallel sides to which said layers are attached.

4,048,508

APPARATUS FOR DOPING A SEMICONDUCTOR CRYSTALLINE ROD

Joachim Martin; Ernst Haas, both of Erlangen, and Manfred Schnoeller, Haimhausen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 11, 1975, Ser. No. 603,680
Claims priority, application Germany, Aug. 12, 1974, 2438710
Int. Cl.² B01J *17/34*
U.S. Cl. 250—492 A **35 Claims**



1. An apparatus for predetermined and reproducible doping of a crystalline semiconductor rod by the formation of dopant atoms via radiogenic radiation initiated by irradiating such rod comprising:

a housing having end and side walls joined together to define a hollow irradiation chamber therein;

an axially and rotatably movable rod support means mounted on an end wall of said housing and extending into said chamber for supporting a semiconductor rod;

a drive means operationally coupled with said rod support means for effecting controlled axial and rotational movement of said support means;

a radiation source positioned outside said housing for producing a radiation field capable of initiating radiogenic reactions in a semiconductor rod; and

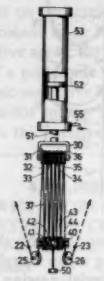
a connection means mounted on a side wall of said housing for providing communication between said chamber and said radiation field.

4,048,509

GAMMA-IRRADIATION TREATMENT APPARATUS

Adolf Sieber, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 29, 1975, Ser. No. 599,964
Claims priority, application Switzerland, Aug. 21, 1974, 011443/74
Int. Cl.² H01J *37/00*
U.S. Cl. 250—522 **4 Claims**



1. In an apparatus for treating goods with gamma radiation, the combination of

a frame;

at least one gamma radiation source mounted in said frame for selectively irradiating the goods;

an elevator for moving said frame between a screened non-irradiating position and an irradiating position of said source with respect to the goods to be treated, said elevator including a block and tackle having a fixedly mounted pulley block, a movably mounted pulley block, and at least one run connected to said frame and disposed over said pulley blocks, and

a servomotor including a cylinder and a piston slidably mounted in said cylinder and having a rod directly connected to said movably mounted pulley block for moving said latter pulley block relative to said fixedly mounted block whereby a small movement of said piston causes a corresponding movement of said movable pulley block and a greater movement of said run and said frame.

4,048,510

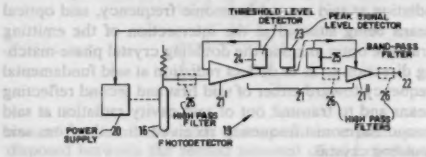
CIRCUIT ARRANGEMENTS FOR CONTROLLING DETECTOR SIGNALS IN SURFACE INSPECTION SYSTEMS

Graham Morley Clarke, and George Fisher, both of Edinburgh, Scotland, assignors to Ferranti Limited, Hollinwood, England

Filed Feb. 24, 1976, Ser. No. 660,928
Claims priority, application United Kingdom, Feb. 27, 1975, 8168/75; Mar. 27, 1975, 13109/75
Int. Cl.² G01N *21/32*
U.S. Cl. 250—563 **10 Claims**

1. A surface inspection system including a detector having

photodetection means responsive to light received to produce a detector signal having an amplitude related to the intensity of the light received, and an equalisation circuit arrangement comprising amplification means operable to amplify the detector signal, first signal level detector means responsive to an amplified detector signal appearing in the amplification means to control the level of the detector signal applied to the amplification means, second signal level detection means responsive to said amplified detector signal to compensate for components of the detector signal due to the reception of ambient light, and band-pass filter means responsive to said amplified detector signal to compensate for variations in said signal due to changes in the optical gain of the detector by controlling the gain of the amplification means in accordance with said variations.

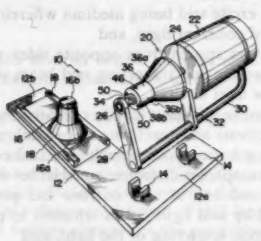


4,048,511

AUTOMATIC OUTPUT CONTROL METHOD AND DYNAMO EQUIPMENT FOR GENERATING SETS USING AUTOMOBILE WHEEL FRICTION DRIVE

Tsuguhiko Watanabe, 5-13, 1-chome, Ebara-cho, Nakano, Tokyo, Japan

Continuation-in-part of Ser. No. 499,483, Aug. 22, 1974, Pat. No. 3,943,370. This application Oct. 3, 1975, Ser. No. 619,685
Claims priority, application Japan, Aug. 25, 1975, 50-102221
Int. Cl.[2] H02P *9/04*
U.S. Cl. 290—1 R 5 Claims



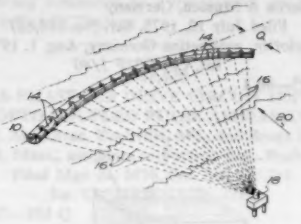
1. An automatic output control method for dynamos of generating sets using automobile driving wheel friction drive relating to generating sets where electricity generation is achieved by rotating the dynamo shaft in contact with a driving wheel of an automobile, and featuring a drum driving the dynamo by friction from the automobile wheel, the drum being tapered and having a parallel part so as to permit the displacement of the said tapered drum in the axial direction due to the screw action as it revolves freely against the shaft of said dynamo, where the said displacement is deliberately controlled by means of a coil spring incorporated between the said shaft and the tapered drum so as to transmit the driving force, so that, in the operation of the said dynamo, changes in the automobile driving force required for the driving changing load of the dynamo are absorbed automatically by the changing revolution ratio due to differences in the circumference as the said tapered drum moves in the axial direction and so that the changing driving force required for the dynamo under the changing load conditions is continuously maintained at a constant rate or rotation for a given frictional drive force from the automobile wheel.

4,048,512

SYSTEM FOR GENERATING POWER FROM WAVE MOTIONS OF THE SEA

Eric Wood, Ossett, England, assignor to Insituform (Pipes & Structures) Ltd., England

Filed Feb. 6, 1976, Ser. No. 656,043
Claims priority, application United Kingdom, Feb. 7, 1975, 05254/75; Feb. 8, 1975, 05453/75; Apr. 23, 1975, 16740/75; May 1, 1975, 18131/75; May 1, 1975, 18132/75; May 14, 1975, 20247/75; June 12, 1975, 25287/75; Aug. 16, 1975, 34185/75
Int. Cl.[2] F03B *13/10, 13/12*
U.S. Cl. 290—53 11 Claims



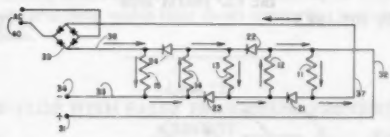
1. A power generation system which is for the generation of energy from the wave motions of the sea and which is buoyantly supported by the sea in use comprising spine elements defining a spine on which ducks are rockably mounted, the system further including tension cable means pressing the spine elements towards each other thereby to define the spine, and energy conversion means for converting the rocking motions of the ducks in to a form which can be transmitted from the system.

4,048,513

RECTIFIER CONTROLLED CIRCUIT

Robert F. Frost, Severna Park, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 16, 1976, Ser. No. 714,416
Int. Cl.[2] H05B *1/02*
U.S. Cl. 307—28 9 Claims



1. An electrical circuit configuration for producing equal power consumption by equal loads when energized selectively from multiple power sources having voltages of differing magnitudes comprising:

a. first and second equal load elements each having a first terminal thereof connected to a first conductive lead and a second terminal thereof connected to a second conductive lead;

b. a rectifier serially connected between said load elements in said first conductive lead;

c. said first and second conductive leads adapted for connection selectively to a first and second power source having voltage of differing magnitudes with the ratio of voltage magnitude of said second power source to the voltage magnitude of said first power source equal to the total number of said load elements; and

d. said rectifier connected for corresponding current flow so that when said electrical circuit configuration is energized selectively by unidirectional current from said first power

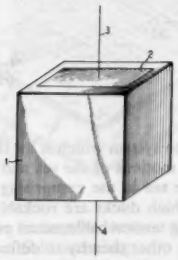
source said rectifier presents a low resistance to current flow and said load elements are connected in parallel and when said circuit configuration is energized selectively by unidirectional current from said second power source said rectifier presents a high resistance to current flow and said load elements are serially connected, said load elements consuming equal power for parallel and serial connection.

4,048,514

PYROELECTRIC NON-LINEAR OPTICAL COMPONENT

Siegfried Haussuehl, Erftstadt-Lechenich, and Kurt Recker, Bonn, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 10, 1975, Ser. No. 594,627
Claims priority, application Germany, Aug. 1, 1974, 2437179
Int. Cl.² G02F *1/40*
U.S. Cl. 307—88.3 **5 Claims**



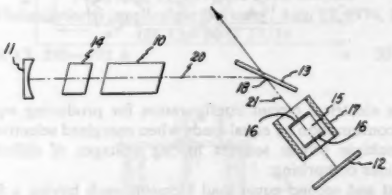
1. A pyroelectric non-linear optical component comprising a body consisting of morocrystalline orthorhombic magnesium barium fluoride ($MgBaF_4$) and means for changing the optical properties of said body.

4,048,515

BROADBAND LASER WITH INTRACAVITY CRYSTAL FOR GENERATING SECOND HARMONIC RADIATION

Yung S. Liu, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 14, 1976, Ser. No. 696,055
Int. Cl.² H02M *5/04*
U.S. Cl. 307—88.3 **14 Claims**



1. A high-power, second harmonic frequency generating laser comprising:

a neodymium-doped glass radiation-emitting structure disposed within a cavity optically-resonant at the fundamental frequency of said laser, said cavity including first and second reflecting means defining the extreme ends of said cavity, said first reflecting means being oriented normally to the optic axis of said emitting structure;

a nonlinear doubling crystal disposed within said cavity and oriented such that its phase-matching direction is slightly misaligned from the normal to said second reflecting means, the angular relationship of said first and second reflecting means being selected such that the optic axis of said emitting structure and the phase-matching direction of said doubling crystal intersect at a point within said cavity;

a Q-switching crystal in said cavity optically aligned with said radiation-emitting structure and adapted to control initiation of oscillation in said cavity; and

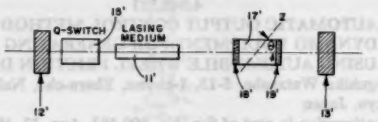
optical means substantially reflective to radiation at said fundamental frequency and substantially transparent to radiation at said second harmonic frequency, said optical means being situated at the intersection of the emitting structure optic axis and the doubling crystal phase-matching direction so as to deflect radiation at said fundamental frequency toward either of said first and second reflecting means and to transmit out of said cavity radiation at said second harmonic frequency received directly from said doubling crystal.

4,048,516

LASER APPARATUS FOR PRODUCING STIMULATED RAMAN SCATTERING

Eugene O. Ammann, Los Altos, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Dec. 2, 1976, Ser. No. 746,670
Int. Cl.² H03F *7/00*
U.S. Cl. 307—88.3 **4 Claims**



1. Apparatus for producing stimulated Raman scattering comprising

a laser having

a lasing medium,

means to excite said lasing medium whereby to produce a beam of coherent light, and

laser mirrors spaced from opposite sides respectively of said medium and traversing said beam whereby to define the laser cavity,

switch means in said laser cavity operative on said beam,

means to activate and deactivate said switch means whereby to produce a succession of pulses of said coherent light,

a body of transparent dielectric material between said lasing medium and one of said mirrors and positioned to be traversed by said light pulses whereby to produce stimulated Raman scattering of the light, and

means to cause said scattered light to oscillate through said dielectric material comprising said laser mirrors.

4,048,517

LOGIC ELEMENT

Ronald Rathbone, Taufkirchen, and Peter Rydval, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 28, 1976, Ser. No. 700,734
Claims priority, application Germany, July 8, 1975, 2530424
Int. Cl.² H03K *19/22, 19/08*
U.S. Cl. 307—213 **1 Claim**

1. A logic element, particularly a bipolar gate circuit for an LSI-circuit, comprising a pair of Schottky-diodes, a pair of resistances and a transistor, a first input to which a terminal of a first of said diodes is connected in high resistance direction, a second input to which a terminal of the second of said diodes is connected in high-resistance direction, the second terminals of said diodes being connected to one terminal of a first resistance and to the base of said transistor, the other terminal of said first resistance being connected to a reference potential, said second resistance having one terminal connected to the

collector of said transistor, and the other terminal thereof, being connected to the second terminal of said diodes, and a

second transistor having its emitter-collector path operatively disposed between the second terminal of said diodes and the associated terminal of the first resistance.

4,048,518

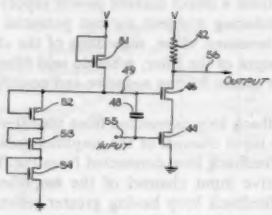
MOS BUFFER CIRCUIT

James T. Koo, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Division of Ser. No. 656,935, Feb. 10, 1976, abandoned. This application Dec. 27, 1976, Ser. No. 754,119

Int. Cl.[2] H03K *19/40, 17/04*

U.S. Cl. 307—214 **3 Claims**



1. In an MOS inverter which includes an input transistor coupled in series with a load means, an improvement comprising:

a decoupling transistor coupled between said load means and said input transistor;

the gate of said decoupling transistor being coupled to a controlled variable potential means for controlling the gate potential of said decoupling transistor in response to a change of voltage on the gate of said input transistor;

whereby the voltage changes on the respective gates of said input transistor and said decoupling transistor together cause said decoupling transistor to rapidly decouple said input transistor from said load means, thereby allowing the output signal from said inverter to charge more quickly.

4,048,519

REGENERATOR CIRCUIT FOR CCD ELEMENTS

Kurt Hoffmann, Taufkirchen; Guenther Meusburger, and Gottfried Wotruba, both of Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

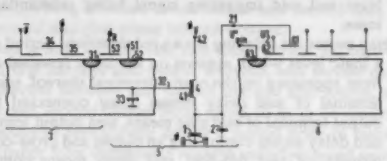
Filed Aug. 25, 1976, Ser. No. 717,705

Claims priority, application Germany, Sept. 18, 1975, 2541686

Int. Cl.[2] H01L *29/78;* **H03K** *5/18;* **G11C** *19/28*

U.S. Cl. 307—221 D **6 Claims**

1. Regenerator circuit for CCD elements comprising a first CCD and a second CCD, a first MOS capacitance, a second capacitance connected in series with said first capacitance, the point at which said two capacitances are connected in series with one another being the output of said regenerator circuit and being connected to an input electrode of said second CCD, the output of said first CCD including an output stage, an output diffusion zone, a terminal to which a potential ϕ_t can be connected, a transistor connected on the one hand to said point and on the other hand to said terminal, a gate electrode of said



transistor being connected by a line to said output diffusion zone of said first CCD stage.

4,048,520

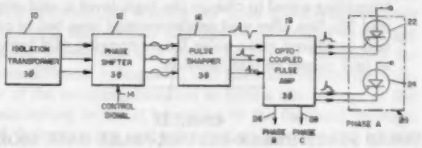
THREE-PHASE SCR DRIVE CIRCUIT USING AN OPTO-COUPLED PULSE AMPLIFIER

Nicholas G. Muskovac, Rockville, Md., and Bruce I. Formhals, Norwood, Mass., assignors to Vectrol, Inc., Rockville, Md.

Filed May 24, 1976, Ser. No. 689,261

Int. Cl.[2] H03K *17/72, 1/12*

U.S. Cl. 307—252 Q **6 Claims**



1. An SCR drive circuit comprising:

a plurality of means for selectively shifting each phase of multiple phase electrical signals;

respective means each having an output and connected in circuit with an output of each phase shifting means for shaping each of the phase shifted signals; and

respective opto-coupled means connected in circuit with an output of a respective shaping means for generating trigger signals for firing SCR devices connected as loads to respective opto-coupled means;

respective means connected between an input of each phase shifting means and power lines for isolating the respective phase shifting means from direct connection to the power lines.

4,048,521

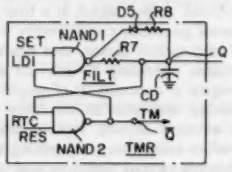
FLIP-FLOP WITH FALSE TRIGGERING PREVENTION CIRCUIT

Francis T. Thompson, Murrysville, and Michael B. Brennen, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 535,626, Dec. 23, 1974, Pat. No. 3,989,999. This application July 14, 1976, Ser. No. 705,301

Int. Cl.[2] H03K *3/286*

U.S. Cl. 307—291 **4 Claims**



1. A set-reset flip-flop, comprising:

gate means, the set input terminal of said flip-flop being connected to an input terminal of said gate means, said

gate means having an output terminal at which a logic level appears in response to the occurrence of a triggering signal at said set input terminal, the duration of said logic level and said triggering signal being substantially the same;

delay means for delaying for a predetermined period of time a logic level which appears on the input terminal thereof from appearing on the output terminal thereof, said input terminal of said delay means being connected to said output terminal of said gate means, said output terminal of said delay means comprising an output and cross-coupling terminal of said flip-flop, said delay means comprising resistive means and capacitive means connected together in integrating circuit relationship for effecting said delay as a function of the charging time constant thereof and said logic level, said output and cross-coupling terminal disposed between said resistive means and said capacitive means; and

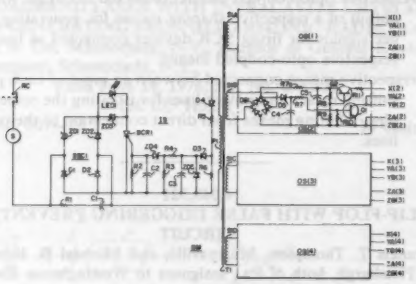
discharge means interconnected with said terminal for discharging said capacitive means with a time constant which is smaller than said charging time constant, said charging time constant representing a time which is shorter than the duration of a desired triggering signal but larger than the expected duration of an undesired noise pulse on said set input terminal to thus allow said desired triggering signal to change the logic level at said output of said flip-flop after said predetermined time but to prevent said undesired noise pulse from changing said logic level at said output of said flip-flop.

4,048,522

SOLID STATE BREAK-BEFORE-MAKE BASE MODULE AND ASSOCIATED CONTACT ELEMENTS

Wardell Gary, and Emroy W. Lange, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 576,833, May 12, 1975, abandoned.
This application Feb. 3, 1977, Ser. No. 765,507
Int. Cl.[2] H03K *3/295, 5/13, 17/60*
U.S. Cl. 307—293 **8 Claims**



1. A solid state relay, comprising:

a. input circuit means having switch means therein; and

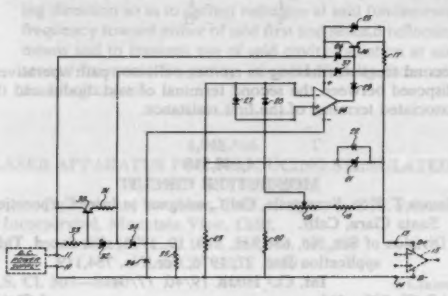
b. bracketing break-before-make means connected to said switch means of said input circuit means, said bracketing break-before-make means operating to provide a first contact-break output signal at a first set of output terminals thereof generally concurrently with a first change of state of said switch means, said bracketing break-before-make means operating to provide a first contact-make output signal at a second set of output terminals thereof at a first delay time plus an on delay time after said first change of state of said switch means, said bracketing break-before-make means operating to provide a second contact-break output signal at said second set of output terminals generally conurrently with a subsequent change of state of said switch means, said bracketing break-before-make means operating to provide a second contact-make output signal at said first output terminals thereof at a second delay time plus said on delay time after said subsequent change of state of said switch means.

4,048,523

ELECTRONIC FILTER WITH ACTIVE ELEMENTS

Joseph John Curcio, Boalsburg, Pa., assignor to Paoli High Fidelity Consultants Inc., Paoli, Pa.

Filed Oct. 1, 1976, Ser. No. 728,786
Int. Cl.[2] H03K *1/02, 1/12*
U.S. Cl. 307—297 **7 Claims**



1. An electronic filter for eliminating alternating current components from a direct current power supply and for continuously producing a direct current potential at its output with a predetermined value, regardless of the change in load across the output of the filter, wherein said filter comprises:

a. amplifier means having negative and positive input channels;

b. first feedback loop connected from the filter output to the negative input channel of the amplifier means;

c. second feedback loop connected from the filter output to the positive input channel of the amplifier means, said second feedback loop having greater resistance than the first feedback loop so that the combination of the signals received on the input channels is always negative, and the amplifier remains stable;

d. means, responsive to the output of the amplifier means, for controlling the current flowing from the filter input to the filter output, whereby the output voltage of the filter is controlled in response to the potential difference between the two feedback loops;

e. means for providing positive and negative bias voltage for the amplifier means; and

f. means, responsive to the filter output voltage, for varying the providing means so that the positive bias voltage for the amplifier is related to the filter output voltage.

4,048,524

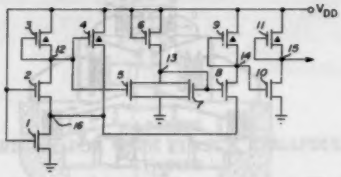
MOS VOLTAGE LEVEL DETECTING AND INDICATING APPARATUS

Ronald C. Laugesen, Sunnyvale, and Mark Shin-Dong Shieu, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 21, 1976, Ser. No. 679,120
Int. Cl.[2] H03K *5/153, 3/295, 3/353, 17/30*
U.S. Cl. 307—304 **3 Claims**

1. In a MOS integrated circuit, a voltage level detecting and indicating circuit apparatus comprising: MOS integrated circuit means responsive to a change in the magnitude of a voltage in said circuit having a first node at which occurs a first signal when said magnitude of said voltage is changed to a first predetermined magnitude, said occurrence of said first signal being independent of at least one of a plurality of process variables including threshold voltage, mobility, body effect factor and lateral diffusion within a predetermined range of magnitude of said variable, and a second node at which occurs a second signal when said magnitude of said voltage is changed

to a second predetermined magnitude and a third signal when said magnitude of said voltage is changed to a third predetermined magnitude, said occurrence of said second and third signals being dependent on at least one of said plurality of process variables.

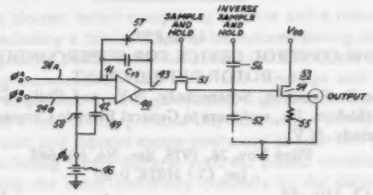


4,048,525

OUTPUT CIRCUIT FOR CHARGE TRANSFER TRANSVERSAL FILTER

Howard S. Goldberg, Schenectady, and William E. Engeler, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,496
Int. Cl.[2] H03K *5/20, 5/08;* G11C *19/28;* H03H *7/10*
U.S. Cl. 307—353 **6 Claims**



1. A transversal filter comprising

a substrate of semiconductor material of one conductivity type,

a first plurality of electrodes insulatingly overlying said substrate, each split into a first and a second part with a gap therebetween,

a second plurality of electrodes insulatingly overlying said substrate, each spaced between adjacent electrodes of said first plurality, said first and second pluralities of electrodes forming a plurality of stages of a shift register,

means for connecting the first parts of said electrodes of said first plurality to a first conductive line,

means for connecting the second parts of said electrodes of said first plurality to a second conductive line,

means for introducing packets of charge representing successive samples of an analog signal into said shift register,

charge clocking means to effect the transfer of charge from storage region to storage region underlying said first and said second pluralities of electrodes including means for applying first and second phase related voltages to said first and said second pluralities of electrodes respectively, said first voltage being applied to said first and said second lines, said second voltage having a predetermined periodicity,

differential sensing means connected to said first and second lines for detecting a difference in signal on said lines in response to the transfer of charge from storage regions underlying said second plurality of electrodes to storage region underlying said first plurality of electrodes for obtaining a sum of weighted samples of said analog signal including

a high gain differential amplifier having a pair of input terminals and an output terminal, one of said input terminals being an inverting input terminal and the other being a non-inverting terminal, a first capacitor, said inverting terminal connected to said output terminal through said first capacitor and also connected to said first line, said non-inverting terminal connected to said second line,

a source of said first phase related voltage,

first and second diodes, said first diode connected between said first line and said output terminal, said second diode connected between said second line and said source, said first and second diodes being poled so as to be rendered conductive periodically during a period prior to transfer of charge from the storage regions underlying said second plurality of electrodes to the storage regions underlying said first plurality of electrodes and rendered non-conductive during a time including the time of transfer of charge from the storage regions underlying said second plurality of electrodes to the storage regions underlying said first plurality of electrodes in response to said second phase related voltage on said second plurality of electrodes capacitively coupled to said first plurality of electrodes,

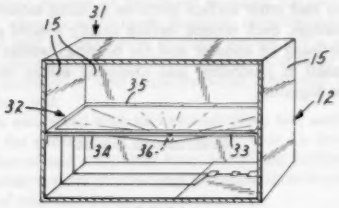
whereby each of said lines is charged to substantially the value of said first phase related voltage of said source periodically prior to the transfer of charge into the storage regions underlying said first plurality of electrodes and thereafter said lines are isolated from said source, and charge periodically transferred from the storage regions underlying said second plurality of electrodes to storage regions underlying said first plurality of electrodes induces different voltages on said lines and causes the voltage of the inverting terminal to follow the voltage of the noninverting terminal by virtue of the feedback through said first capacitor and a total charge is supplied to said first capacitor which is proportional to the difference in charge delivered to said lines during said transfer of charge, said total charge appearing as a change in voltage at said output terminal.

4,048,526

KINETIC SENSOR EMPLOYING POLYMERIC PIEZOELECTRIC MATERIAL

Allen L. Taylor, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 603,193, Aug. 8, 1975, abandoned. This application July 19, 1976, Ser. No. 706,297
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—329 **6 Claims**



1. A detector for producing a signal in response to movement of the detector, comprising:

a housing;

a sensing unit fastened by one or more ends thereof to said housing and having:

a flexible layer of poled, polymeric, piezoelectric material that produces electrostatic charges of opposite polarity on its opposite surfaces when subjected to bending; and

a flexible conductive electrode carried on no more than the portions of each surface of said piezoelectric layer adjacent said one or more ends;

a weight connected to said sensing unit in such fashion that said weight acts as an inertial mass to produce bending of

the sensing unit in respect to movement of said detector; and

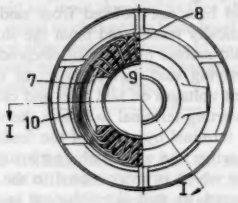
sensing circuitry electrically connected with the conductive electrodes carried on each surface of said piezoelectric layer to sense said electrostatic charges and to provide a signal indicating motion of said detector.

4,048,527

STATOR AGGREGATE FOR ROTATING ELECTRIC MACHINES

Stig Lennart Hallerback, Vastra Frolunda, and Leif Lachonius, Sure, both of Sweden, assignors to SKF Industrial Trading and Development Company, B.V., Jutphaas, Netherlands

Division of Ser. No. 504,460, Sept. 9, 1974, Pat. No. 3,932,929. This application Oct. 9, 1975, Ser. No. 621,031
Claims priority, application Sweden, Sept. 28, 1973, 7313243
Int. Cl.[2] H02K *1/04*
U.S. Cl. 310—43 **4 Claims**



1. An electric machine consisting of a stator and a rotor, said stator comprising at least two sections made of a moulded plastic material, magnetic flux providing means in the form of laminations formed integrally in each section, said laminations running axially and having inwardly directed terminal edge portions adjacent the inner arcuate surface portions and forming the stator poles, the central part of the laminations forming the stator yoke, each section having circumferentially spaced inner peripheral surface portions of arcuate cross section, said inner peripheral surface portions disposed on the circumference of a circular trace defining the rotor cavity, at least one of said sections having a longitudinally extending interior channel between said inner surface portions forming mounting means for windings, each section having axially spaced pocket sections defining an annular seat for bearings within which the rotor shaft is journalled and clamping means securing the sections together.

4,048,528

STARTING MOTOR FOR LARGE INERTIA LOAD

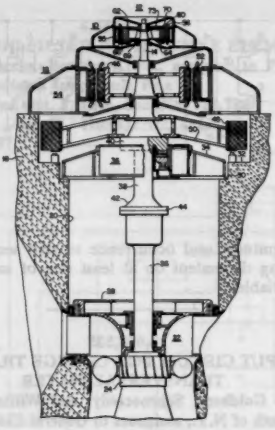
Eugene C. Whitney, Forest Hills, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 14, 1975, Ser. No. 621,993
Int. Cl.[2] H02K *9/19, 7/02*
U.S. Cl. 310—54 **16 Claims**

1. An induction motor having a rotor disposed for rotation within an annular stator, said rotor comprising:

a continuous circular metallic rim serving as a rotor winding;

a closed container of cooling fluid disposed adjacent and radially inward of said rim, said cooling fluid being in thermal communication with said rim to transfer thermal energy therfrom; and a shaft concentrically disposed within said rim, a metallic web secured to said shaft for supporting said rim for rotation within said stator, said



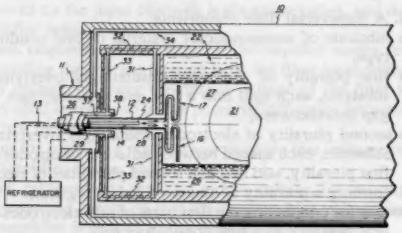
web being resilient to permit radial expansion of said rim in response to temperature changes therein.

4,048,529

FLOW CONTROL DEVICE FOR SUPERCONDUCTIVE ROTOR REFRIGERANT

Bruce D. Pomeroy, Schenectady, N.Y., and Philip G. Kosky, Bethlehem, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,665
Int. Cl.[2] H02K *9/20*
U.S. Cl. 310—54 **10 Claims**



1. In a transport mechanism wherein liquefied gas is conducted to the superconductive windings of an electrical generator in order to supply a pool bathing at least part of said windings with the whole of said windings being maintained at cryogenic temperatures, the transport function being accomplished via conduit means disposed generally axially of said generator and in flow communication with the inner end of dispensing means adapted to conduct the liquefied gas to said pool, said pool being disposed radially outward of said despensing means, the improvement comprising:

said dispensing means being tubular and providing a continuous path for fluid flow therethrough, said path being generally radial in disposition with at least one reversal of direction therein to accommodate a single continuous body of liquid such that the net weight of said body of liquid is balanced by the combined weights of two radially-extending columns of vapor, one such column being in contact with each end of said body of liquid; and

means being provided in flow communication with said

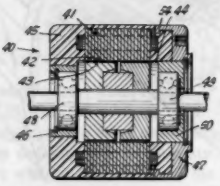
conduit means for returning vapor from the inner end of said dispensing means to the outside of said generator.

4,048,530

ELECTRIC MOTOR WITH PLASTIC ENCAPSULATED STATOR

George A. Kaufman, Jr., Avon, Conn., assignor to The Superior Electric Company, Bristol, Conn.

Filed May 5, 1975, Ser. No. 574,356
Int. Cl.[2] H02K 5/00
U.S. Cl. 310—89 1 Claim



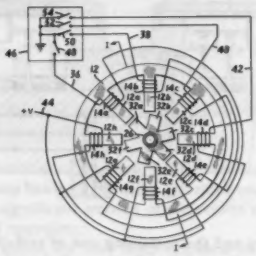
1. An electric motor comprising a stator and a rotor; said stator including a tubular stack of laminations having an axis, winding means positioned on said stack and a hardened plastic covering encapsulating said stack and windings and being formed to provide a through opening aligned with the stack axis; said rotor having portions disposed within the opening and an axis; and support means positioned at each end of the stack including means integral with the plastic covering for supporting the rotor essentially coaxially in the stator and means for securing the integral means to the hardened plastic covering with the covering constituting the sole structure for securing the integral means to the stack to prevent movement of the integral means transverse to the axis of the stator stack and outwardly therefrom, in which the integral means of the support means includes at least a metal insert formed with a through hole positioned adjacent an end portion of the opening and being adhered to the covering, in which the insert has an inner surface transverse to the axis, in which the stator stack has an adjacent surface and in which the inner surface and the adjacent surface abut at the outer periphery of the stack and insert, in which the insert includes a substantial exposed portion extending diametrically along one end surface of the stator, in which the insert and covering are formed to have cooperating mechanically interlocking portions, in which the support means includes another insert having an inner surface transverse to the stator axis, in which the stator stack has an adjacent surface transverse to the stator axis, in which the inner surface of the another insert and its adjacent stack surface are spaced apart with covering material being positioned therebetween for solely supporting the insert, in which the stator stack is formed to have inwardly extending poles having inner faces that define a portion of the through opening, in which the poles are spaced from each other, in which the covering material fills the spaces between the poles to occupy all of the interior of the stator that is unoccupied by the other parts of the stator, in which the covering material in the spaces extends for the complete length of the stator stack to interconnect both support means, in which the support means further includes a bearing positioned adjacent each end of the through opening for rotatably supporting the rotor and in which there are cooperating means on the stator and rotor for limiting axial movement of the rotor with respect to the stator.

4,048,531

VARIABLE RELUCTANCE STEPPER MOTOR

Kenneth G. Buess, Union City, N.J., and Murray Hefter, Far Rockaway, N.Y., assignors to The Singer Company, Little Falls, N.J.

Filed June 5, 1974, Ser. No. 476,547
Int. Cl.[2] H02K 37/00
U.S. Cl. 310—49 R 6 Claims



1. A variable reluctance stepper motor comprising:

a. a first stator having a plurality of poles, with said poles energizable to generate and selectively rotate a magnetic field, including means for energization comprising a first winding encircling each of said poles and first circuit means for providing plural series circuits, each series circuit including therein a distinct group of such first windings, said first stator generating an incrementally rotating magnetic field upon sequential energization of said series circuits;

b. a rotor shaft;

c. a first rotor having a second number of poles different from the number of poles in said first stator, said first rotor supported by said shaft in radially spaced relation to said first stator for imparting rotation to said shaft in accordance with rotation of said magnetic field, said first stator and said first rotor together defining a predetermined number of rotational positions for said first rotor where minimum magnetic reluctance exists between said first stator and said first rotor;

d. a second stator having a third number of poles;

e. a second rotor supported by said shaft in radially spaced relation to said second stator, said second rotor having a fourth number of poles different from said third number of poles with the poles of said rotor and said stator defining a further number of rotational positions for said second rotor wherein a minimum magnetic reluctance exists between said second stator and said second rotor, said further rotational position number being equal to or an integral multiple of said predetermined rotational position number; and

f. means associated with said second stator and said second rotor for generating a fixed magnetic field for restraining rotation of said rotor shaft from one of said further predetermined number of rotational positions upon de-energization of said first stator.

4,048,532

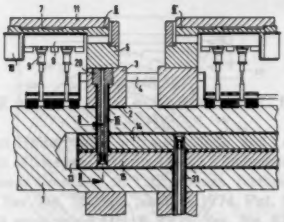
ROTATING RECTIFIER ASSEMBLY

Heinrich Klüter, Wattenscheid, and Gerhard Krieger, Mulheim, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Nov. 26, 1975, Ser. No. 635,672
Claims priority, application Germany, Dec. 5, 1974, 2457615
Int. Cl.[2] H02K 11/00
U.S. Cl. 310—68 D 3 Claims

1. In an electrical machine having a rotary shaft, a rotating rectifier assembly comprising two support wheels mounted on the shaft in insulated relationship thereto and formed with respective ring flanges, said two support wheels forming direct

current poles, the shaft being formed with an axial bore, at least two direct current conductors disposed in said axial bore, and three current connecting bolts extending radially from each of said two support wheels at uniformly spaced divisions about the periphery thereof, two of said current connecting bolts extending directly to one of said direct current conductors of



given polarity and the remaining one of said current connecting bolts extending insulatedly through the other of said direct current conductors having a polarity opposite to said given polarity, said three current connecting bolts all terminating in the respective direct current conductor in a common plane transverse to the respective direct current conductor.

4,048,533

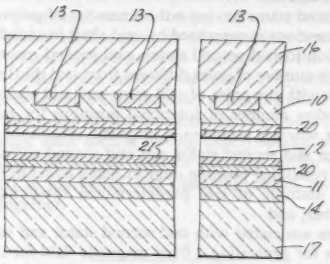
PHOSPHOR OVERCOAT

David C. Hinson, Whitehouse; Wolfgang W. Bode, Sylvania; Michael E. Fein, and H. Joseph Hoehn, both of Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 188,490, Oct. 12, 1971, abandoned. This application Oct. 26, 1973, Ser. No. 409,874

Int. Cl.² H01J 1/62

U.S. Cl. 313—188 **13 Claims**



1. In an information display gas discharge device containing opposing electrode arrays defining coplanar multiple gas discharge units in said device, each having a discharge gap under about 10 mils, an ionizable gaseous medium, and a phosphor means selectively excited at least in part by radiation from a selected one of said gas discharge units in the device, the improvement comprising an overcoat on said phosphor, said overcoat being selected from the group consisting of alkali and alkaline earth fluorides, being at least partially transmissive to phosphor excitation radiation from the gas discharge and being of a material having a relatively high coefficient of secondary emission of electrons when struck by photons, ions, metastable atoms, or metastable molecules for conditioning of the gaseous medium and the thickness of said overcoat being sufficient to screen out undesirable particles and radiation to increase the life of the phosphor.

4,048,534

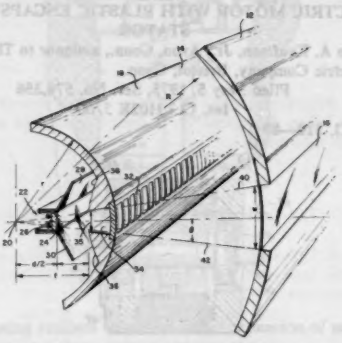
RADIAL FLOW ELECTRON GUN

George R. Brewer, Malibu, and Kurt Amboss, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 25, 1976, Ser. No. 670,471

Int. Cl.² H01J 1/46, 21/10

U.S. Cl. 313—293 **3 Claims**



1. An electron gun comprising:

an elongated planar electron source for providing parallel electron flow therefrom along the length of said electron gun said electron source being a heated strip of thermionic material having a front surface for emitting electrons;

a tubular anode having an external surface which is cylindrical with respect to an axis and having a slot therethrough parallel to said axis, said electron source being positioned within said anode between said slot and the axis of said cylindrical anode surface, said anode slot forming an electron lens at the inner surface of said anode, said lens having a focus substantially on said axis to form a cylindrically divergent electron beam in said slot, this positioning being such as to produce divergent electron flow with radial electron paths which are independent of beam current and anode voltage;

Pierce electrodes positioned adjacent said thermionic cathode surface and extending in an axial direction so that a parallel flow of electrons is delivered by said source to said slot and electron lens action in said slot causes beam divergence;

a bar grid in said slot, the external surface of said bar grid lying in line with said cylindrical exterior surface of said anode, said bar grid having bars which have a bar depth in the direction of electron flow at least substantially twice the bar grid spacing in the axial direction so that said bars are of sufficient depth in the direction of beam flow and with close enough spacing in a direction parallel to said axis that the electric field external of said anode does not substantially penetrate and slot so that radial beam flow is unperturbed; and

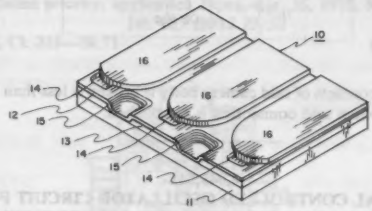
an accelerator electrode having a cylindrical interior surface with its axis lying on said axis of said anode, a window in said accelerator electrode, said window lying at the interior cylindrical surface of said accelerator electrode so that accelerating electric equi-potential lines between said anode and said accelerator electrode are uniformly cylindrical to accelerate the electron beam in a radial direction with the beam passing through said window so that current density distribution at said window is independent of beam current and anode voltage.

4,048,535

LEAD-TIN-TELLURIDE PHOTODETECTOR ARRAY

John T. Cox, Alexandria; Michael B. Garber, Woodbridge; Marilyn A. Jasper, Springfield, and Paul LoVecchio, Reston, all of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 4, 1976, Ser. No. 683,441
Int. Cl.² H01J *31/38, 29/45*
U.S. Cl. 313—367 **1 Claim**



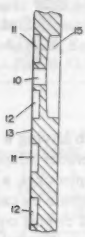
1. A photodiode array comprising:
a wafer of Pb_xSn_2Te;
an insulating layer covering most of the exposed surface of said chip defining only a plurality of small rectantular windows wherein the surface of the chip is exposed;
a thin layer of indium covering all of said insulating layer and all of said rectangular windows; and
a plurality of thick indium lead-out pads mounted on said thin layer, each pad overlapping only a different one of said rectangular windows.

4,048,536

SHADOW MASK WITH PLURALITY OF RECESSED REGIONS EXTENDING ACROSS MASK IN TWO DIRECTIONS

Silas A. Brown, Lake Elmo, Minn., assignor to Buckbee-Mears Company, St. Paul, Minn.

Filed Mar. 18, 1976, Ser. No. 668,317
Int. Cl.² H01J *29/07, 29/08*
U.S. Cl. 313—403 **6 Claims**



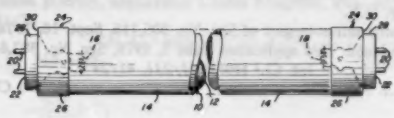
1. An aperture mask having a plurality of openings therein for the projection of an electron beam therethrough comprising:
a sheet of metal having a front side and a back side, said sheet of metal having a plurality of openings located therein, said plurality of openings forming a plurality of rows of openings, a plurality of cavities located on the back side of said mask with a cavity located around and including each of said plurality of openings in said mask;
a plurality of recessed regions forming a pattern of recessed regions and located on the front side of said sheet of metal, said pattern of recessed regions extending across said mask in two directions so that said mask can be formed in at least two directions without rupturing said sheet of metal.

4,048,537

PROTECTIVE ULTRAVIOLET-TRANSMITTING SLEEVE FOR FLUORESCENT LAMP

Ronald G. Blaisdell, Saugus; Harold L. Hough, Beverly, and Robert E. Levin, Hamilton, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Filed June 4, 1976, Ser. No. 693,026
Int. Cl.² H01J *61/40, 61/42*
U.S. Cl. 313—489 **21 Claims**



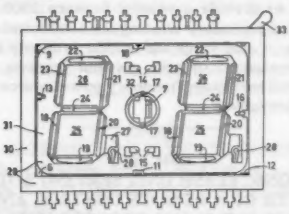
1. A lamp assembly comprising, in combination:
an electric lamp having a frangible envelope and adapted for emitting a significant amount of ultraviolet radiation during normal operation;
a protective shield for said lamp disposed in substantially adjacent relationship with said envelope and formed of a plastic material comprising a fluorocarbon resin having a wall thickness in the range of about 0.010 to 0.040 inch which has a spectral transmittance of at least about 80% of the ultraviolet radiation emitted from said lamp over the wavelength range from about 320 to 400 nanometers and, after at least 100 hours of normal operation of said lamp, maintains a transmittance of at least about 80% of said ultraviolet radiation and substantially maintains its mechanical integrity; and,
means for retaining said shield in the aforesaid relationship with said envelope.

4,048,538

GAS DISCHARGE CHARACTER DISPLAY TUBE WITH APERTURED MICA PLATE

Adrianus A. M. Hendriks, and Henri-Jean G. M. Van Daelen, both of Emmasingel, Eindhoven, Netherlands

Filed June 15, 1976, Ser. No. 696,230
Int. Cl.² H01J *61/067, 61/36, 61/64*
U.S. Cl. 313—519 **3 Claims**



1. A gas discharge tube for displaying at least two characters, comprising an envelope having flat front and rear glass walls and containing an ionizable medium, a plurality of adjacent matrix groups within said envelope, the matrix elements in at least one group comprising two plate-shaped anodes and elongate cathode strips which are arranged around said two plate-shaped anodes as a stylized 8, an additional anode associated with each of said matrix groups, both the cathode strips and the anodes each forming one assembly, supply conductors secured in a vacuum-tight manner to the glass rear wall by means of enamel, a frame of sintered glass connecting said front and rear walls, a mica plate having openings therein to expose the active front sides of the electrodes, said mica plate being clamped between bent parts of the supply conductors and parts of strips fixed by means of enamel with the supply conductors to the rear wall, the distance between the front wall and the rear wall being determined by parts of said strips bent at right angles to the rear wall, the conductors and parts

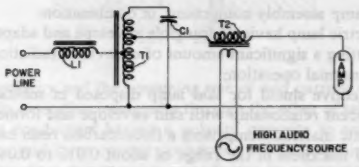
being fixed by enamel to the rear wall only below the frame of sintered glass and the flat-plate anodes being moreover fixed by enamel to the rear wall over a part of their surface.

4,048,539

APPARATUS FOR STARTING HIGH PRESSURE GASEOUS DISCHARGE LAMPS

Loren H. Walker, and William P. Kornrumpf, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 506,116, Sept. 16, 1974, abandoned. This application June 2, 1975, Ser. No. 582,840
Int. Cl.[2] H05B *41/231, 41/24*
U.S. Cl. 315—176 **1 Claim**



1. In a ballast system for a high pressure metal vapor arc discharge lamp including an ionizable gas in which the gas discharge has been extinguished, an improved means for restarting said lamp while the pressure of said lamp is on the order of 1000 Torr and the temperature is approximately 4000° K, said means comprising:

an inductor adapted to be connected to a low voltage, low frequency power source;

a ferro-resonant autotransformer connected to said inductor;

a capacitor connected in parallel with said autotransformer to provide parallel resonance at said low frequency;

a transformer having primary and secondary windings, said secondary winding connected in series with said autotransformer and said lamp;

means connected to said primary winding for applying a substantially undamped high audio frequency voltage of between 17,000 and 60,000 Hertz and of a magnitude sufficient to provide a voltage between 2500 and 4000 volts at said secondary winding for a sufficient time after extinction of said lamp and within 1 minute thereof to cause reionization of said gas and increase the level thereof until said lower frequency power source can maintain said ionization.

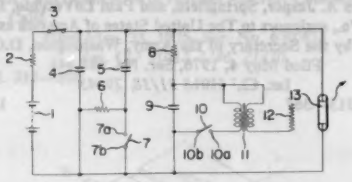
4,048,540

ELECTRONIC FLASH UNIT SERVING BOTH AS TRANSMITTER OF A REMOTE CONTROL AND FLASH UNIT FOR FLASH PHOTOGRAPHY

Yozo Iida, Komae; Yasuhito Kawahara, and Shigemi Igarashi, both of Tokyo, all of Japan, assignors to Nippon Kogaku K.K. and Sato Koki K.K., both of Tokyo, Japan

Filed Jan. 20, 1976, Ser. No. 650,692
Claims priority, application Japan, Jan. 27, 1975, 50-12165[U]
Int. Cl.[2] H05B *41/32*
U.S. Cl. 315—241 P **5 Claims**

1. An electronic flash unit serving both as the transmitter of a remote control device and a flash unit for flash photography, comprising; a power source, a flash discharge tube, a discharging circuit having an interlocking switch (7; 17) adapted to be closed in response to electrical connection of said flash unit to the synchro contacts of a camera body, said discharging circuit producing a greater magnitude of discharging current for the flashing of said flash discharge tube during the closing of said switch than during the opening of said switch, and a trigger circuit (8, 9, 10, 11, 12) having an extraneously operable trigger switch (10, 10*a*, 10*b*) and effective to trigger said flash discharge tube to effect the discharge of said discharging circuit, whereby the quantity of flash light emitted from said flash discharge tube when the connection of said flash unit to the



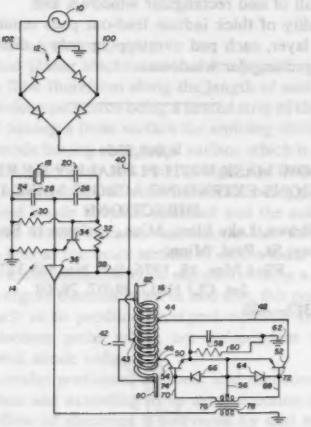
synchro contacts of said camera body is broken is less than that emitted when said connection is established.

4,048,541

CRYSTAL CONTROLLED OSCILLATOR CIRCUIT FOR ILLUMINATING ELECTRODELESS FLUORESCENT LAMP

Guy Adams, Monroe, and Scott D. Goldman, Monsey, both of N.Y., assignors to Solitron Devices, Inc., Tappan, N.Y.

Filed June 14, 1976, Ser. No. 695,852
Int. Cl.[2] H05B *41/16, 41/24*
U.S. Cl. 315—248 **3 Claims**



1. In an electrodeless bulb having a sealed chamber about a cavity leading to a base member adapted to mate with a conventional incandescent lamp socket, a circuit to excite a coating on the inner walls of the bulb by causing radiation of a fluid in said sealed chamber, said circuit comprising:

a coil having a predetermined number of turns located central to the major bulb area having a first length extending from the turns to a closure at the end of said cavity in the sealed chamber and a second length extending from the turns to a juncture of the cavity with the base member, said lengths being connected by a resonant circuit across said turns and said turns having connections at each end and intermediate the ends;

a voltage source;

a crystal controlled circuitry connected to said voltage source, said circuitry providing a voltage output at a frequency below 25 kc;

a class D amplifier circuit connected to the end connections of the turns of said coil;

a lead connecting the connection intermediate the ends to the voltage source; and

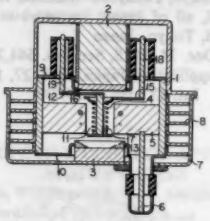
an inductive couple of the crystal circuitry and class D amplifier circuit.

4,048,542

PERMANENT MAGNETS OF DIFFERENT MAGNETIC MATERIALS FOR MAGNETRONS

Hiroshi Miura, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 21, 1976, Ser. No. 678,757
Claims priority, application Japan, Apr. 25, 1975, 50-50348
Int. Cl.[2] H01J *25/50*
U.S. Cl. 315—39.71 17 Claims



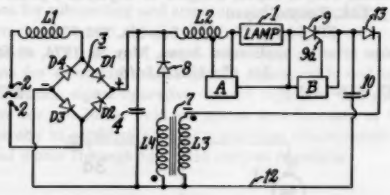
1. A magnetron comprising:
an anode in which resonance cavities are defined,
a cathode disposed at the axis of the anode,
a pair of permanent magnets creating a magnetic field in a direction substantially vertical to an electric field produced between the anode and cathode,
one of the permanent magnets being made and readily magnetizable and demagnetizable magnetic material and the other being made of difficultly magnetizable and demagnetizable magnetic material having a larger coercive force than that of the magnetic material of the said one of the permanent magnets,
a yoke magnetically coupled to the pair of permanent magnets, and
sealing means for hermetically sealing the anode.

4,048,543

DISCHARGE LAMP OPERATING CIRCUIT

Daniel V. Owen, and David W. Knoble, both of East Flat Rock, N.C., assignors to General Electric Company, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,041
Int. Cl.[2] H05B *41/231, 41/30*
U.S. Cl. 315—205 11 Claims



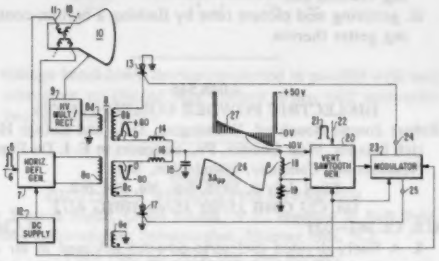
1. A load operating circuit comprising, in combination, a direct current power source, a capacitor connected across said power source, an inductor, controlled switch means and load connecting means connected in series across said power source, a transformer having a primary winding and a secondary winding, said primary winding having a higher inductance than said inductor, first unidirectional conducting means connected in series with said primary winding across said power source, second unidirectional conducting means connected in series with said secondary winding across said power source, and control means coupled to said controlled switch means for repetitively operating the same at predetermined intervals, whereby DC pulses may be applied to the load for operation thereof.

4,048,544

SWITCHED VERTICAL DEFLECTION SYSTEM

Peter Eduard Haferl, Zurich, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,809
Claims priority, application United Kingdom, Feb. 20, 1975, 07161/75
Int. Cl.[2] H01J *29/70, 29/76*
U.S. Cl. 315—408 11 Claims



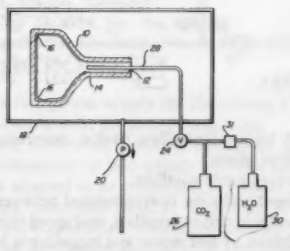
1. In a deflection system for cathode ray tubes, said deflection system of the type including a horizontal deflection circuit for deflecting an electron beam of said cathode ray tube in a horizontal direction in response to a horizontal deflection wave, a vertical deflection circuit comprising:
a vertical deflection winding responsive to a sawtooth current therethrough for deflecting said electron beam of said cathode ray tube in a vertical direction; and
means for applying successively smaller portions of the energy of said horizontal deflection wave during one interval of said vertical deflection and successively greater portions of said energy of said horizontal deflection wave during a second interval of said vertical deflection to said vertical deflection circuit for producing all of said sawtooth current in said vertical deflection winding, said first and second intervals occurring during the trace portion of each vertical deflection interval.

4,048,545

CATHODE RAY TUBE PROCESSING

Thomas Harry Madden, Euclid, and Clair Wilbur Reash, Fairview Park, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Nov. 24, 1976, Ser. No. 744,819
Int. Cl.[2] H01J *9/50*
U.S. Cl. 316—2 2 Claims



1. Method for treating and gettering a picture tube which

has been previously gettered by flashing of a barium-containing material therein and which as a result of said flashing has a barium film on portions of its internal surface, said method comprising:

i. converting said barium film to barium carbonate by contacting the barium film on the inner surface of said previously gettered picture tube with a gas mixture consisting essentially of CO_2 and water vapor said gas mixture being at least about 10% by volume of CO_2 and said water vapor being in an amount of at least about 1% of the volume of CO_2 but less than the amount which corresponds to the dew point of water vapor in said mixture,

ii. subsequently evacuating said picture tube to a pre-gettering vacuum and

iii. gettering said picture tube by flashing a barium-containing getter therein.

4,048,546

DIELECTRIC POWDER COMPOSITIONS

Robert Joseph Bouchard, Wilmington, Del., and Lothar Heinrich Brixner, West Chester, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 9, 1975, Ser. No. 594,282

Int. Cl.² C04B *35/00, 35/46;* H01G *4/12*

U.S. Cl. 361—321 **16 Claims**

1. A finely divided dielectric powder calcined in air at a temperature in the range 750°–900° C. for at least 5 minutes, the powder having the composition

$$(Sr_xPb_{1-x}TiO_3)_a(PbMg_{0.5}W_{0.5}O_3)_b$$

wherein

x is 0–0.10,

a is 0.35–0.5,

b is 0.5–0.65, and

a plus b equals one,

substantially all the powder particles being 20 microns or less in largest dimension, said powder being sinterable in air at temperatures in the range 900°–1050° C. to produce bodies having high dielectric constant.

4,048,547

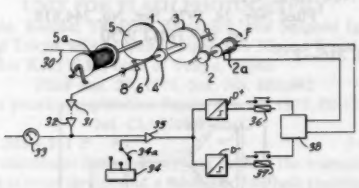
TORQUE RESPONSIVE DEVICE

Jean Francois Pierre Marie Havard, Carquefou; Michel Marceau Gaschet, Nantes, and Henri Marie Dominique Charonnat, Reze, all of France, assignors to Brissonneau et Lotz, Carquefou, France

Continuation-in-part of Ser. No. 365,424, May 30, 1973, abandoned. This application Jan. 14, 1975, Ser. No. 540,998

Int. Cl.² H02P *7/00*

U.S. Cl. 318—488 **8 Claims**



1. A torque controlling device comprising:

a drive motor,

a driven cable windlass,

a speed reducing interconnected between said drive motor and said driven windlass, said speed reducing device being driven by said motor and including at least one intermediate gear train comprising a unitary pinion and gear mounted for free rotation on a stationary shaft by axially spaced bearings, said shaft being supported at its ends on a fixed support;

at least one pair of stress gauges fixed to said shaft and arranged to respond to bending of said shaft to produce a signal proportional to the torque applied to said intermediate gear train by said motor; and

means responsive to predetermined changes in said signal to regulate the torque delivered by said motor to said intermediate gear train.

4,048,548

STEPPING MOTOR

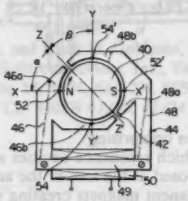
Fumio Nakajima, Tokyo; Takayasu Machida, Iruma, and Kenji Yamada, Koganei, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,262

Claims priority, application Japan, Sept. 27, 1975, 50-116617

Int. Cl.² H02K *29/00*

U.S. Cl. 318—138 **2 Claims**



1. A stepping motor comprising:

a permanent magnet rotor; and

a stator including a driving coil and two stator pole pieces spaced from each other to provide an air gap within which said rotor is rotatably mounted, each of said stator pole pieces including asymmetric first and second portions, said first portions of each stator pole piece being arranged diametrically opposite each other with respect to a central axis between said stator pole pieces, said first and second portions including magnetic flux paths of different lengths whereby one of said portions has a higher flux reluctance to the flux path than the other, a static equilibrium point being provided on one of said first and second portions of each stator pole piece.

4,048,549

CIRCUIT FOR ELIMINATING CURRENT NOISES FROM D.C. MOTOR

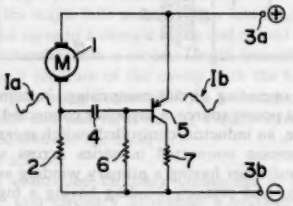
Ken Satoh, Tokyo, Japan, assignor to Olympus Optical Company, Ltd., Tokyo, Japan

Filed May 27, 1975, Ser. No. 580,777

Claims priority, application Japan, May 30, 1974, 49-62497

Int. Cl.² H02P *5/16*

U.S. Cl. 318—345 F **2 Claims**



1. A circuit for eliminating current noises from a d.c. motor for use in a d.c. motor drive circuit including a bridge circuit having one branch in which the d.c. motor is connected, the bridge circuit including a pair of feed terminals and a pair of

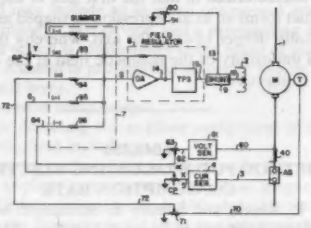
detection terminals, a comparison transistor connected across said pair of detection terminals for detecting a change in the back e.m.f. of the motor as the speed thereof varies so as to control a current flow through a feed transistor which is connected intermediate a power source and one of said feed terminals; said noise elimination circuit comprising a capacitor having its one end connected to one terminal of said d.c. motor, a waveform inverting transistor having its base connected with the other end of the capacitor, and a bias resistor for applying a bias voltage to the transistor, said capacitor being effective to apply a.c. noise current developed by the d.c. motor to the base of the transistor, which in turn inverts the noise current and supplies an inverted current to the power source to substantially eliminate said current noises.

4,048,550

FLUX CORRECTIVE CONTROL APPARATUS FOR MOTOR DRIVES

Walter R. Harris, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 3, 1975, Ser. No. 546,849
Int. Cl.² H02P *3/14*
U.S. Cl. 318—356 **1 Claim**



1. In a direct-current motor control apparatus including a field winding and a field current regulator responsive to an armature current signal and a field reference signal for establishing a drooping speed-load characteristic, the combination of:

means for deriving a motor armature voltage representative signal;

means for deriving a motor armature current representative signal;

means for subtracting said armature voltage signal from said armature current signal to derive a speed correction signal;

means for summing said reference signal with said speed correction signal operative on said regulator to compensate for non-linear field variations as a function of load, thereby to establish a linear speed-load characteristic for said motor through said field current regulator.

4,048,551

BATTERY CHARGING CIRCUIT

Barry Sheldon Bosik, Parsippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

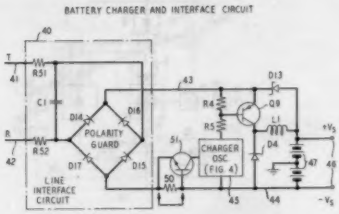
Filed Dec. 5, 1975, Ser. No. 638,164
Int. Cl.² G05F *1/56*; H02J *7/06*
U.S. Cl. 320—21 **10 Claims**

1. A remotely powered battery charger comprising

a switching signal generator,

an energy storage type direct current converter driven by switching signals from said generator,

a rechargeable battery connected to said converter, and



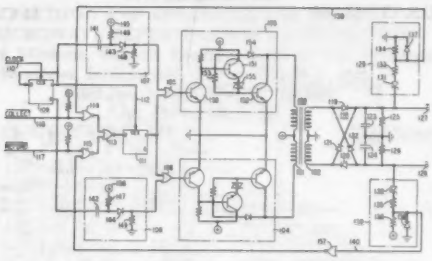
a voltage breakdown device connected in parallel with said converter to charge said battery when said converter becomes inoperative.

4,048,552

DIGITALLY REGULATED INVERTER

Dale Eugene Stone, Cedar Knolls, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 12, 1976, Ser. No. 657,353
Int. Cl.² H02M *3/335*
U.S. Cl. 363—25 **5 Claims**



1. A digitally-controlled inverter comprising:

a source of clock pulses,

a transformer responsive to said clock pulses,

a rectifier connected to the output of said transformer,

means for inhibiting only one or more successive full cycles of said clock pulses, and

means responsive to the output of said rectifier for controlling said inhibiting means.

4,048,553

INTERRUPTION-FREE POWER SUPPLY

Gunter Schierer, Hochstadt, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 24, 1976, Ser. No. 688,985
Claims priority, application Germany, June 5, 1975, 2525138
Int. Cl.² H02M *1/18*
U.S. Cl. 363—57 **6 Claims**

1. An interruption-free power supply for connecting a supply network to a network to be protected comprising:

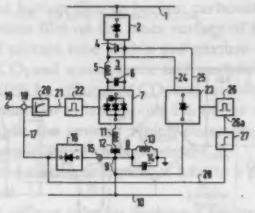
a line-commutated, controlled rectifier having an input adapted to be connected to said supply network and an output which is adapted to be connected to a battery;

a self commutating controlled inverter connected to the output of said line-commutated, controlled rectifier, said inverter including filter means adapted to be connected to said network to be protected;

an externally commutated rectifier having a first end con-

nected to the output of said controlled inverter and a second end adapted to be connected to said battery;

means for sensing the output voltage of said inverter;



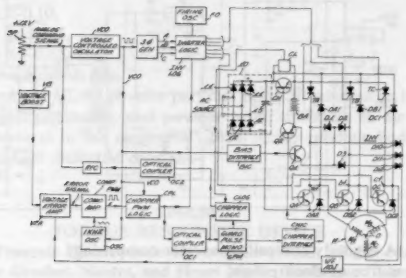
and means responsive to said sensed output voltage for controlling said externally commutated rectifier so as to enable said externally commutated rectifier to carry increased current when a voltage dependent on said sensed output voltage exceeds a predetermined limit.

4,048,554

VARIABLE FREQUENCY, VARIABLE VOLTAGE POWER SUPPLY

Frederick A. Stich, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 22, 1976, Ser. No. 744,131
Int. Cl.[2] H02M *7/00*
U.S. Cl. 363—98 **51 Claims**



1. An inverter for supplying variable frequency and variable magnitude voltage to a load including a voltage-controlling chopper transistor coupled in series respectively with at least a first and second load current carrying controlled rectifier across the positive and negative polarities of said source, means for time ratio controlling said chopper transistor as a function of the magnitude of an analog command signal, means for modulating said controlled rectifiers at a frequency which is a function of the magnitude of said analog command signal to establish inverter output frequency, and commutation means for intermittently applying reverse bias voltage to said controlled rectifiers to commutate them off while said transistor chopper is turned off.

4,048,555

SPIN RESONANCE SPECTROMETER AND MAGNET STRUCTURE

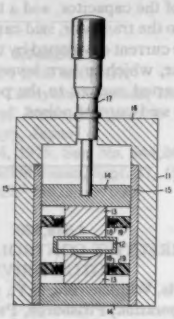
Louis William Rupp, Jr., Kintnersville, Pa., and Walter Michael Walsh, Jr., Berkeley Heights, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 15, 1976, Ser. No. 696,471
Int. Cl.[2] G01R *33/08*
U.S. Cl. 324—.5 MA **7 Claims**

1. A magnet structure comprising:

a. a pair of coaxial permanent magnets, each of which is circularly symmetric about the common axis, and each of which possesses a first face and a a second face, the first faces of which are spaced from one another to form a gap free from domain magnetic material, the magnets being axially magnetized with poles of opposite polarity facing one another; and

b. a housing including soft magnetic material in contact with the permanent magnets at the second face of each magnet,



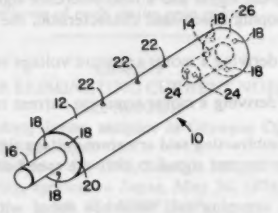
the housing holding the magnets in spaced relationship and providing a return path for magnetic flux around the gap characterized in that the first face of each permanent magnet forms an axial depression so shaped as to be monotonically deeper toward the axis, whereby the radial and axial uniformity of the magnetic field at the center of the gap is improved.

4,048,556

METHOD FOR EVALUATING ELECTRODE CONSUMPTION RATE

Maurice P. Roach, and Stanley L. Strudthoff, both of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 31, 1976, Ser. No. 672,307
Int. Cl.[2] G01R *33/14*
U.S. Cl. 324—40 **10 Claims**



1. A method of determining the approximate consumption rate of a plurality of graphite electrodes which comprises:

applying an electrical signal to a number of the plurality of graphite electrodes to generate eddy currents in said electrodes;

sensing the generated eddy current to obtain eddy current values;

using said number of electrodes in an electric arc furnace and measuring the consumption rate of each of the said number of electrodes during said use;

determining a standard correlation between eddy current values and the said measured consumption rates; and

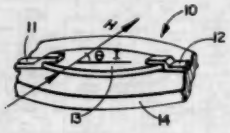
comparing the eddy currents values obtained from the remaining plurality of graphite electrodes with the standard eddy current correlation value to determine the approximate consumption rate thereof.

4,048,557

PLANAR MAGNETORESISTANCE THIN FILM PROBE FOR MAGNETIC FIELD ALIGNMENT

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 17, 1975, Ser. No. 632,735
Int. Cl.[2] G01R *33/02*
U.S. Cl. 324—46 **13 Claims**



1. In combination,
a magnetic bubble domain structure including;
a layer of material which is capable of forming and supporting magnetic bubble domains therein;
a magnetizable device supported by said layer for selectively manipulating a magnetic bubble domain in said layer; and
means for applying magnetic fields to said structure; said magnetic fields including,
a bias magnetic field which is substantially orthogonal to said structure and is useful in forming magnetic bubble domains in said layer and which bias magnetic field may include an in-plane component which is in the plane of said device, and a propagating magnetic field which is substantially in the plane of said device and is useful in propagating magnetic bubble domains in said layer,
the improvement comprising:
means for detecting the in-plane component of said bias magnetic field including,
a planar magnetoresistance effect probe for measuring the in-plane component of the bias magnetic field applied to said magnetic bubble domain structure,
said probe formed on said layer and substantially coplanar with said device,
said probe comprising at least one magnetic element,
said magnetic element having dimensions such that the demagnetization field of said element is greater than the coercivity and anisotropy field thereof;
means for supplying a constant current to said magnetic element; and
means for producing an output voltage signal adapted for sensing and measuring the change in magnetoresistance in said magnetic element in response to a magnetic field which change in magnetoresistance is a function of the in-plane component of the bias magnetic field in the plane of said magnetic element and said magnetic bubble domain device such that any non-symmetry in the output signal is a measure of the in-plane bias component of the bias magnetic field.

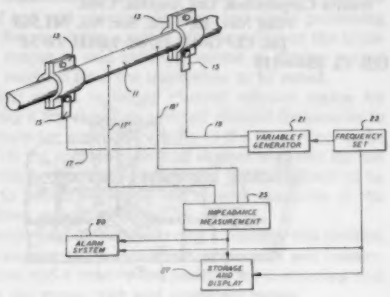
4,048,558

METHOD AND APPARATUS FOR DETECTING METAL FAILURES IN SITU

Clark Goodman, 95 Antigua Court, Coronado, Calif. 92118

Filed Aug. 6, 1975, Ser. No. 602,429
Int. Cl.[2] G01R *27/00*
U.S. Cl. 324—57 R **36 Claims**

1. A method of detecting metal failures in situ comprising:
a. conductively coupling an electrical generator to a section of metal to be tested to form a closed conductive circuit;
b. passing currents at different frequencies through said section of metal to be tested;
c. measuring at least one electrical characteristic of the circuit at each of said different frequencies; and
d. comparing said at least one characteristic with a previous value of that characteristic whereby the presence and depth of a failure in said metal can be detected by determining the frequencies at which a change in said characteristic is found.

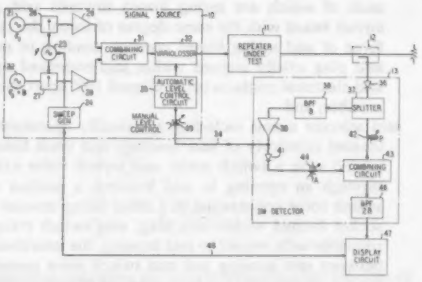


4,048,559

METHOD AND APPARATUS FOR TESTING MICROWAVE REPEATERS FOR IM DISTORTION

Hotze Miedema, Boxford, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 5, 1977, Ser. No. 756,959
Int. Cl.[2] G01R *29/00*
U.S. Cl. 324—57 SS **14 Claims**



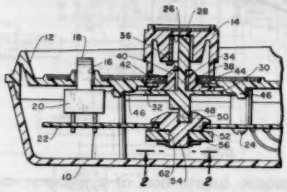
1. Apparatus for measuring the non-linearity of a device subject to distortion, which comprises:
means for generating a first signal of frequency f_o;
means for generating a second signal of frequency $(f_o+\delta)$, where δ is an offset frequency which is small compared to the bandwidth of the device under test;
means for generating a third signal of swept frequency f;
means for combining said first, second and third signals thereby to generate first and second test signals of frequency (f_o+f) and $(f_o+\delta+f)$ respectively, the frequencies f_o f and δ being selected such that the test signals scan the band of interest, said test signals being applied to the input of the device under test; and
detector means, connected to the output of the device under test, for measuring the amplitude of any component in the output signal for the device under test of frequency $(f_o-\delta+f)$ or $(f_o+2\delta+f)$, said measuring means including means for cancelling any component of frequency 2δ caused by distortion within the detector means itself.

4,048,560

ELECTRICAL METER APPARATUS

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

Filed Nov. 15, 1976, Ser. No. 741,543
Int. Cl.[2] G01R *15/08*; H01H *19/58*
U.S. Cl. 324—115 **3 Claims**



1. In combination with an electrical meter apparatus, said electrical meter apparatus being mounted within a housing, said housing being connected with visual observation means for denoting various electrical readings, electronic circuitry mounted on a printed circuit board, said printed circuit board located within said housing, said electrical circuitry connected to operate said visual observation means, said electronic circuitry including a plurality of separate circuit paths, the improvement comprising:

selector means connected to said housing and being movable to select an individual said circuit path of said plurality of separate circuit paths, said selector means including a plug rotatably mounted within an oversized opening within said printed circuit board, said plug capable of a limited amount of canting movement relative to said printed circuit board, an electrical contact member attached to said plug the portion of said contact member to be in physical contact with said printed circuit board, said portion comprising at least a pair of electrical contacts each of which are spring biased towards said printed circuit board with the same degree of force, the resultant force of said spring biased contacts tending to maintain said plug axially aligned within said oversized opening, said electrical contacts being aligned 180° apart about said member; and

said selector means including a manually operatable knob located exteriorly of said housing, said knob being connected with a switch rotor, said switch rotor extending through an opening in said housing, a portion of said switch rotor cooperating in a loose fitting manner with a socket formed within said plug, said switch rotor being rotatable with respect to said housing, the interconnection between said housing and said switch rotor permitting a limited amount of canting movement of said switch rotor relative to said housing.

4,048,561

APPARATUS FOR PREVENTING SIMULTANEOUS TRANSMISSION AND CHANNEL SELECTION IN A TRANSMITTER OR TRANSCEIVER

Glade Wilcox, Kalamazoo, and Keith A. Packard, Greenville, both of Mich., assignors to Robyn International, Inc., Rockford, Mich.

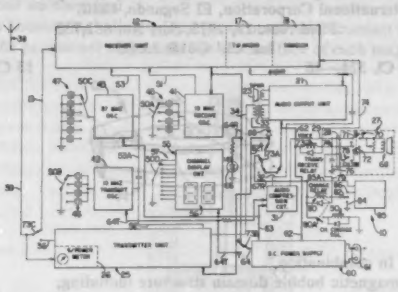
Filed Nov. 28, 1975, Ser. No. 636,021
Int. Cl.[2] H04B *1/04, 1/54*
U.S. Cl. 325—22 **10 Claims**

1. A radio apparatus, comprising:

a radio transmitter having several alternatively selectable transmission frequencies and a switch connected to said transmitter and having transmit and receive positions, said switch being manually actuable between its transmit and receive positions;

means actuable for switching said transmitter from frequency to frequency among said several frequencies and for stopping said switching at the desired one of the several frequencies; and

locking means operatively connected to said switch and to said frequency switching means and responsive to the



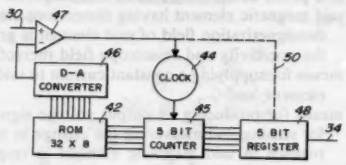
position of said switch for preventing any transmitter frequency switching with said manually actuable switch in its transmit position and for permitting such transmitter frequency switching only with said switch in its receive position.

4,048,562

MONITORING SYSTEM FOR VOLTAGE TUNABLE RECEIVERS AND CONVERTERS UTILIZING VOLTAGE COMPARISON TECHNIQUES

Donald E. Haselwood, Clearwater; Carl M. Solar, Largo, and Jeffrey R. Thumm, Clearwater, all of Fla., assignors to A. C. Nielsen Company, Northbrook, Ill.

Filed May 22, 1975, Ser. No. 580,054
Int. Cl.[2] 340 *347 DA*; H04B *17/00*
U.S. Cl. 325—31 **15 Claims**



1. Apparatus for determining at a central location the channel to which a remotely located receiver tunable to a plurality of channels by a tuning voltage has been tuned comprising:

means for sequentially generating a plurality of digital indications of numbers identifying said channels;

means responsive to said channel number digital indication generating means for sequentially generating a plurality of coded representations of voltages, each said coded representations corresponding to one of said digital indications and being nonlinearly related to said digital indications;

means for sequentially comparing each of said coded representations with the tuning voltage applied to said receiver;

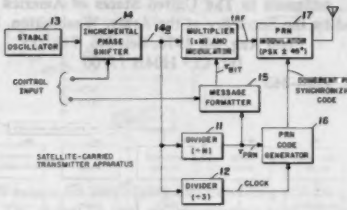
means responsive to said sequentially comparing means for generating a digital code representative of the digital indication corresponding to the coded representation representing a voltage having an amplitude within a predetermined range of amplitudes relative to the amplitude of the tuning voltage applied to said receiver; and

means for transmitting said digital code to the central location.

4,048,563
CARRIER-MODULATED COHERENCY MONITORING SYSTEM

Eugene F. Osborne, Westminster, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 17, 1975, Ser. No. 623,539
Int. Cl.[2] H04B *7/00*
U.S. Cl. 325—58 **10 Claims**



1. In a radio transmission system for transmitting information between spaced location, the combination comprising:

signal source means for generating a carrier signal of radio frequency, f_{rf},

source means for generating a synchronizing code having a repetitive time frame which is numerically related to the period, $1/f_{rf}$, of said carrier signal by a predetermined fixed multiplier,

modulator means connected to said carrier signal source and said synchronizing code source for modulating said carrier signal with said synchronizing code,

transmitter means for transmitting said modulated carrier signal,

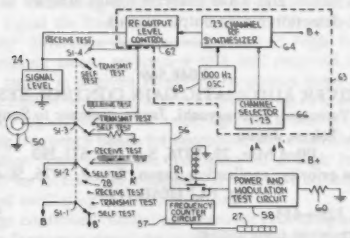
receiver means for receiving said modulated carrier signal and including means for recovering said carrier signal and said synchronizing code from said modulated carrier signal, and

measurement means responsive to said recovered carrier signal and synchronizing code and including counter means and counter control means, said counter control means being responsive to said synchronizing code for controlling said counter means to register a count of the number of whole and fractional cycles of said carrier signal received in a measurement time interval corresponding to the repetitive time frame of said synchronizing code as received.

4,048,564
TRANSCEIVER TEST DEVICE

Thomas Paul Gleeson, Jr., 2118 William St., Cape Girardeau, Mo. 63701

Continuation-in-part of Ser. No. 652,149, Jan. 26, 1976, abandoned. This application Dec. 20, 1976, Ser. No. 752,124
Int. Cl.[2] H04B *1/38, 17/00*
U.S. Cl. 325—67 **18 Claims**



13. A transceiver test device comprising

panel means mounting connector means adapted to receive an antenna connector of a transceiver to be tested, and indicator means for displaying power received from the transceiver to be tested;

transmit test means including means for receiving the output of the transceiver to be tested via the antenna connector thereof and said connector means, and signal processing means for supplying a signal representative of the transceiver output to said indicator means to display output power received from the transceiver to be tested;

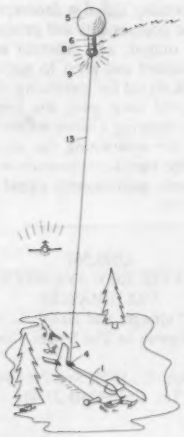
receive test means including channel selector means for supplying a test signal on selected channel frequencies to said connector means for supply to the transceiver to be tested via the antenna connector thereof such that the test signal can be heard on a speaker of the transceiver to be tested to permit testing of the receive operation of the transceiver on various channels; and

test sequence selector means having a transmit test position for connecting said transmit test means with said connector means and a receive test position for connecting said receive test means with said connector means.

4,048,565
LOCATION INDICATING DEVICE

Loyal E. Rice, Sr., Fresno, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 17, 1976, Ser. No. 697,130
Int. Cl.[2] H04B *1/02*
U.S. Cl. 325—114 **1 Claim**



1. A location indicating device for indicating the location of a craft in need of assistance, said craft having a compartment therein and opening on the outside of the craft and a cover on the compartment releasably covering the opening of the compartment and adapted to open when the craft suffers an impact, said location indicating device comprising

a balloon;

a container mounted on the balloon and borne aloft by the balloon when the balloon is inflated;

compressed gas in the container;

trigger means coupling the container to the balloon and affixed to the cover of the compartment for supplying the gas to the balloon to inflate it when the cover is opened, said trigger means comprising a valve operated by a lanyard coupling the valve to the cover;

radio transmitter means in the container for transmitting distress signals;

light means in the container for producing intermittent blue flashes of light;

switch means connected to the transmitter means, light means and to cover of the compartment for activating said transmitter means and said light means when the cover is

opened, said switch means comprising ON-OFF switches for the transmitter means and light means and a lanyard coupling said switches to the cover; and

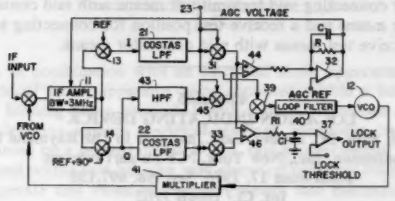
a line wound in the compartment and having a first end affixed to the craft and a second end affixed to the container for tethering the balloon when it is airborne.

4,048,566

SUPPRESSED CARRIER AUTOMATIC GAIN CONTROL CIRCUITRY

Lansing M. Carson, Tempe, and Neil E. Welter, Scottsdale, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Jan. 5, 1976, Ser. No. 646,729
Int. Cl.² H04B 1/68
U.S. Cl. 325—329 **3 Claims**



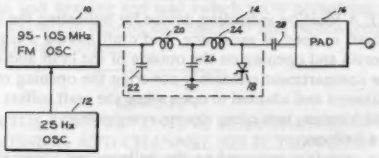
1. In a receiver of the type adapted to receive suppressed carrier signals such as a receiver with a Costas loop configuration, wherein the incoming signal is decomposed into in-phase and quadrature phase components and processed in two channels to obtain data output, and wherein an automatic gain control signal is obtained and used to provide an automatic gain control feedback signal for stabilizing the amplitude level of data output and the loop gain, the improvement which comprises means for deriving a noise estimate signal from one channel and means for subtracting the noise estimate signal from the data and noise signal combination in the other channel to derive the automatic gain control signal and prevent false locking of the receiver.

4,048,567

BROAD BAND MICROWAVE RECEIVER GAIN CALIBRATOR

Edgar A. Johnson, Tujunga, and Bruce L. Myers, Inglewood, both of Calif., assignors to The Singer Company, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,931
Int. Cl.² H03B 21/00
U.S. Cl. 325—363 **3 Claims**



1. A gain calibrator for generating a continuous band of calibration pulses of determinable amplitude over a wide calibration range of radio frequencies, said calibrator comprising:

a frequency modulated signal source having a fundamental frequency that is the Nth subharmonic of the lowest radio frequency in the calibration range, the frequency modulated output of said signal source having a total frequency swing of 1/N of said fundamental frequency;

a low frequency oscillator coupled to modulate said signal source; and

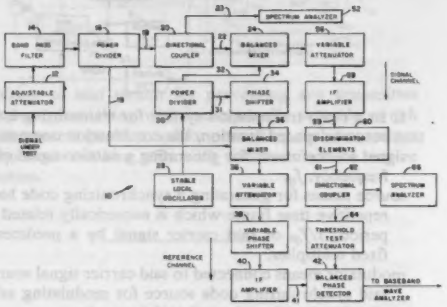
an impulse generator including a step recovery diode coupled to the output of said signal source for producing a continuous and overlapping band of pulses beginning at the lower frequency end of said calibration band and extending to the upper frequency limit of said calibration band.

4,048,568

WIDE OPERATING FREQUENCY RANGE SUPERHETERODYNE FM NOISE ANALYZER

Gustaf J. Rast, Jr.; Thomas A. Barley; Raiford L. Hammond, all of Huntsville, Ala., and James R. Ashley, Colorado Springs, Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 30, 1976, Ser. No. 718,723
Int. Cl.² H04B 17/00
U.S. Cl. 325—363 **8 Claims**



1. A wide operating frequency range analyzer for measuring input carrier frequency signals of very low signal level comprising:

first and second power dividers each having an input and first and second outputs, the input of said first divider being coupled to receive said input carrier signals; first and second balanced mixers each having first and second inputs and an output, the first input of said first mixer being coupled to the first output of said first divider, the second input of said first mixer being connected to the first output of said second divider, the first input of said second mixer being coupled to the second output of said second power divider and the second input of said second mixer being coupled to the second output of said first power divider for providing superheterodyne mixing of signals coupled thereto; oscillator means coupled to said second power divider input for providing a local oscillation signal thereto; quadrature detection means having first and second inputs and an output, said second input being coupled to the output of said second mixer, the output of said detection means being disposed to couple output signals therefrom; discriminator means coupled between the output of said first mixer and the first input of said detection means; and wave analyzer means coupled to receive said detection means output signals.

4,048,569

RECEIVER AUTOMATIC GAIN CONTROL SYSTEM

Wataru Yamatani, Hatogayashi, Japan, assignor to Sony Corporation, Tokyo, Japan

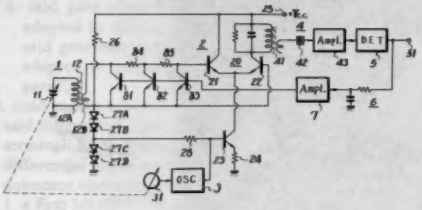
Filed Mar. 29, 1976, Ser. No. 671,393
Claims priority, application Japan, Apr. 9, 1975, 50-43033
Int. Cl.² H04B 1/16
U.S. Cl. 325—414 **5 Claims**

1. A receiver comprising:

a. an antenna circuit having a resonance circuit and which produces an electrical signal in response to a broadcasting signal;

b. automatic gain control coupling means coupled to said

resonance circuit and comprising a voltage divider having a plurality of resistive elements connected in series, and a plurality of variable impedance elements connected in parallel and having commonly connected control inputs, each of said variable impedance elements being connected at one end of one of said resistive elements; and



c. circuit means for amplifying and detecting and for providing a DC signal to said automatic gain control coupling means, said DC signal being directly connected to said variable impedance elements commonly connected control inputs to supply an automatic gain control signal to vary their impedance values.

4,048,570

MULTIPLE-BAND DIGITAL FREQUENCY SYNTHESIZER RECEIVER

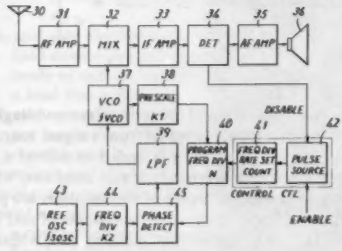
Yasuaki Sumi, Tottori, Japan, assignor to Sanyo Electric Co., Ltd. and Tottori Sanyo Electric Co., Ltd., both of Moriguchi, Japan

Filed May 11, 1976, Ser. No. 685,343

Claims priority, application Japan, May 30, 1975, 50-65938; May 30, 1975, 50-65940; Aug. 29, 1975, 50-105286; May 30, 1975, 50-73699[U]; Oct. 17, 1975, 50-143254[U]

Int. Cl.² H04B *1/26*

U.S. Cl. 325—459 **13 Claims**



1. A multiple-band superheterodyne receiver, comprising means for receiving a plurality of receiving frequency bands each containing high frequency signals of different frequencies, local oscillating means for providing an oscillation frequency signal the frequency of which is different by a given frequency difference from a said received high frequency signal, mixing means responsive to a said received high frequency signal in a given receiving frequency band and said local oscillation frequency signal for providing an intermediate frequency signal, means for selecting one of said plurality of receiving frequency bands for reception, and means for setting information concerning the frequency of a high frequency signal to be received in a selected receiving frequency band, said local oscillating means comprising

voltage controlled oscillating means for providing an oscillation frequency signal the oscillation frequency of which is variable as a function of a given control voltage,

means for storing information concerning a plurality of frequency differences, each corresponding to one of said plurality of receiving frequency bands and responsive to the operation of said band selecting means for selectively withdrawing the information concerning the frequency differences of the corresponding selected receiving frequency band,

first means responsive to said withdrawn information concerning said frequency difference and said information concerning the frequency of a high frequency signal to be received for producing an output at a first frequency which is a function of the sum or difference of said two pieces of information, and

means responsive to the output from said first means for providing a control voltage to said voltage controlled oscillating means, whereby said local oscillating means provides a local oscillation frequency signal the frequency of which is function of the output of said first means which in turn is a function of said two pieces of information.

4,048,571

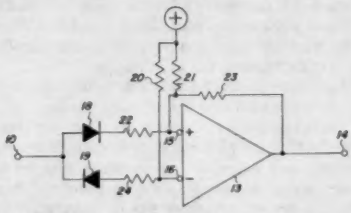
FREQUENCY DOUBLER

Charles L. Jacobson, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 12, 1973, Ser. No. 340,491

Int. Cl.² H03K *1/16;* H03B *19/00*

U.S. Cl. 328—20 **6 Claims**



1. Circuitry for doubling the frequency of a periodic input signal comprising

a differencing amplifier having a first input terminal, a second input terminal, and an output terminal, said amplifier providing a first signal at said output terminal when said first terminal has a greater applied signal level than said second terminal and providing a second signal at said output terminal when said second terminal has a greater applied signal level than said first terminal,

biasing means connected to said amplifier input terminals for providing a higher signal level to said second terminal than to said first terminal, said biasing means including

a single voltage source,

a first resistor connected between said voltage source and said amplifier first input terminal, and

a second resistor connected between said voltage source and said amplifier second input terminal, said second resistor having a smaller resistance value than said first resistor, and

input means connected to said input terminals for increasing the signal level at said first terminal when said input signal is above a predetermined level and for decreasing the signal level at said second terminal when said input signal is below said predetermined level, said input means including

means for receiving said input signal,

a first branch adapted to unidirectionally conduct current from said receiving means to said amplifier first input terminal when said input signal is above said predetermined level, and

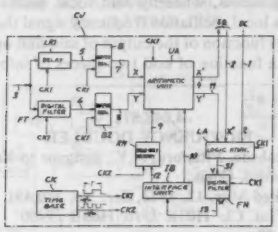
a second branch adapted to unidirectionally conduct current from said amplifier second input terminal to said receiving means when said input signal is below said predetermined level.

4,048,572

ADAPTIVE CORRECTION OF PHASE ERRORS IN NONCOHERENT DEMODULATION OF CARRIER ASYMMETRICALLY MODULATED WITH DIGITAL SIGNALS

Renato Dogliotti; Umberto Mazzei, both of Turin, and Umberto Mengali, Pisa, all of Italy, assignors to CSELT - Centro Studi e Laboratori Telecommunicazioni S.p.A., Turin, Italy

Filed Dec. 20, 1976, Ser. No. 752,168
Claims priority, application Italy, Dec. 18, 1975, 70116/75
Int. Cl.[2] H03K *9/04*
U.S. Cl. 329—104 **12 Claims**



1. A method of correcting distortions due to phase errors in a train of data signals recovered during successive clock cycles by noncoherent demodulation from an asymmetrically modulated carrier, comprising the steps of:

deriving a train of raw bipolar quadrature signals from the train of recovered raw bipolar data signals;

cross-multiplying said raw data signals and said raw quadrature signals with two mutually conjugate trigonometric functions of a magnitude substantially compensating said phase errors, thereby generating corrected bipolar in-phase signals and corrected bipolar quadrature signals;

generating a series of reference signals by quantizing said corrected in-phase signals;

obtaining a succession of bipolar difference signals by subtractively combining said corrected in-phase signals and said reference signals;

multiplying at least parts of said difference signals with at least parts of said corrected quadrature signals to produce bipolar error signals of a polarity which is the product of the polarities of said difference signals and of said corrected quadrature signals;

averaging said error signals over a plurality of clock cycles to obtain a succession of corrective bipolar feedback signals; and

deriving said trigonometric functions from said feedback signals.

4,048,573

AMPLIFIER IMPROVEMENTS FOR LIMITING CLIPPING

Ronald C. Evans, and Sidney A. Corderman, both of Binghamton, N.Y., assignors to McIntosh Laboratory, Incorporated, Binghamton, N.Y.

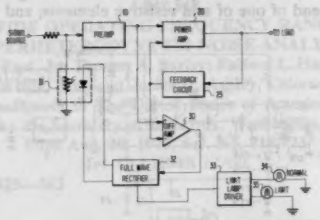
Filed Oct. 15, 1976, Ser. No. 732,824
Int. Cl.[2] H03G *3/30*
U.S. Cl. 330—2 **10 Claims**

1. A device for maintaining linear amplification and to avoid clipping of an electrical signal applied to one input of an amplifier which amplifier includes a negative feedback coupling means coupling an amplified signal back to another input of said amplifier, said device comprising:

a differential amplifier with a pair of inputs, one coupled to said one amplifier input and the other connected to the output of said negative feedback coupling means, said differential amplifier producing an output signal when its inputs are different;

a full wave rectifier connected to the output of said differential amplifier; and,

signal attenuation means coupling a source of said electrical



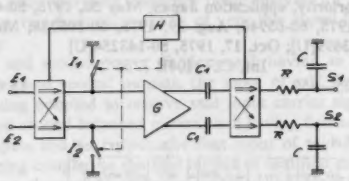
signals to said amplifier and connected to said full wave rectifier for reducing the amplitude of the signal coupled to said amplifier when said differential amplifier produces an output.

4,048,574

METHOD AND A DEVICE FOR ELIMINATING THE RESIDUAL ERROR VOLTAGE OF AN AMPLIFIER

Daniel Barbier, Echirolles; Jean-Michel Ittel, Seyssinet Pariset, and Robert Poujois, Grenoble, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed June 25, 1976, Ser. No. 699,975
Claims priority, application France, Sept. 1, 1975, 75.20599
Int. Cl.[2] H03F *1/02*
U.S. Cl. 330—9 **11 Claims**



1. A method of elimination of the residual error voltage of an amplifier having two inputs supplied from a signal source and two outputs, said amplifier being intended to deliver a signal into an output element downstream of said amplifier, wherein the connections between the inputs of said amplifier are periodically inverted with said source and the outputs of said amplifier are inverted with said output element and wherein an integration is carried out between the outputs of said amplifier and the inputs of the output element.

4,048,575

OPERATIONAL AMPLIFIER

Fuad H. Musa, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 11, 1974, Ser. No. 505,196
The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.
Int. Cl.[2] H03F *3/16, 3/45*
U.S. Cl. 330—22 **4 Claims**

3. An operational amplifier comprising:

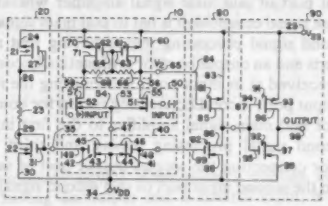
A. a source of potential having at least a first and a second voltage level;

B. a first and a second differential amplifier, each of said differential amplifiers including:

C. differential input means for receiving two input signals to be compared, each of said differential input means comprising:

1. a first MOSFET input device having source, drain and gate electrodes;
2. a second MOSFET input device having source, drain and gate electrodes:
3. said source electrodes of said first and said second input devices being connected together and being coupled to a MOSFET constant current source means;
4. said gate electrode of said first input device being adapted to receive a first input signal to be compared; said gate electrode of said second input device being adapted to receive a second input signal to be compared;

D. load means comprising active load devices coupled to said differential input means and coupled to one or more terminals for producing an output signal responsive to said differential input means, said output terminal having a quiescent operating point and said load means comprises:
1. a first MOSFET load device having source, drain and gate electrodes;
2. a second MOSFET load device having source, drain and gate electrodes;
3. said source electrode of said first load device being connected to said source electrode of said second load device and to said first voltage level;
4. said drain electrode of said first load device being connected to said drain electrode of said first input device for forming a first output terminal;
5. said drain electrode of said second load device being connected to said drain electrode of said second input device for forming a second output terminal;



6. said gate electrode and said drain electrode of said first load device and said gate electrode and said drain electrode of said second load device each being coupled to a load bias means;
7. said second output terminal being coupled to said output means for providing an amplified output signal;

E. wherein said load bias means coupled to said output terminals and to said active load for generating a compensating response for stabilizing said quiescent operating point comprises:
1. a conductor interconnecting said drain electrode of said first load device, said gate electrode of said same device and said gate electrode of said second load device;
2. a resistor connected between said gate electrode of said second load device and said drain electrode of said same device; and
3. a conductor connecting said gate electrode of said first load device and said gate electrode of said second load device;

F. wherein said MOSFET devices of said differential input means of said first differential amplifier are of a first conductivity type;

G. said MOSFET active load devices of said load means of said first differential amplifier are of a second conductivity type opposite to said first conductivity type;

H. said MOSFET devices of said differential input means of said second differential amplifier are of said second conductivity type; and

I. said MOSFET active load devices of said load means of said second differential amplifier are of said first conductivity type; and said operational amplifier further includes:

J. a MOSFET biasing network connected between said first and said second voltage level for providing a first reference voltage and a second reference voltage;

K. a first MOSFET constant current source means coupled to said differential input means of said first differential amplifier, responsive to said first reference voltage for providing a first constant current, and

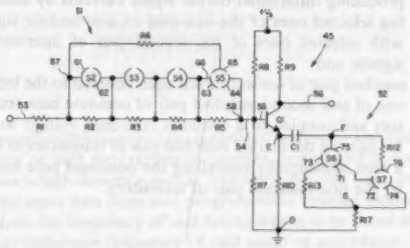
L. a second MOSFET constant current source means coupled to said differential input means of said second differential amplifier, responsive to said second reference voltage for providing a second constant current.

4,048,576

TRANSISTOR AMPLIFIER STAGE WITH SELECTIVELY ADJUSTABLE GAIN CONTROL CIRCUIT

Tom L. Blackburn, San Jose, and Otto G. Wisotzky, San Francisco, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Nov. 28, 1975, Ser. No. 636,018
Int. Cl.[2] H03G *3/30*
U.S. Cl. 330—29 **35 Claims**



23. A resistive pad having an attenuation between an input and an output terminal, measured with respect to a reference point, that is variable in discrete steps and having a net resistance between the input and output terminals, comprising:

first and second resistive elements;

first means electrically connecting one of said first and second resistive elements between the input and output terminals and electrically connecting the other of said first and second resistive elements between the reference point and one side of said one resistive element;

a plurality of control resistors;

a plurality of bi-state switch means; and

second means electrically connecting said control resistors and switch means together in a prescribed pattern across said first and second terminals of said first resistive element, the state of at least a certain one of said switch means being changed to produce a step change in the net resistance measured across said first resistive element, which requires that changing the states of individual switch means produce different prescribed step changes in the decibel value of attenuation that are cumulative.

4,048,577

RESISTOR-CONTROLLED CIRCUIT FOR IMPROVING BANDWIDTH OF CURRENT GAIN CELLS

Charles E. Shinn, II, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

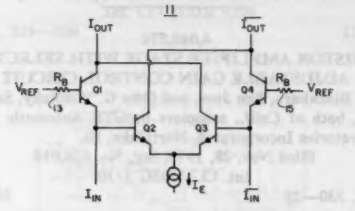
Filed May 7, 1976, Ser. No. 684,516
Int. Cl.[2] H03F *3/45*
U.S. Cl. 330—30 D **4 Claims**

1. A gain-cell circuit with transistors each having a base, a collector and an emitter for providing increased signal bandwidth by utilizing the capacitance inherent in the transistors to achieve pole-zero cancellation, the circuit comprising:

a first matchhed differential pair of common emitter transistors for producing a first pair of intermediate signals at its collectors and forming a dominant pole in response to a

bias current applied to its emitters and differential input signal currents applied to its bases;

a second matched pair of common-base transistors, the emitters of which are coupled to the bases of the transistors of the first matched pair and coupled to receive the differential input signal currents for producing a second pair of intermediate signals at its collectors, the collectors of said second matched pair of transistors being cross-coupled to the collectors of the first matched pair of transistors for



producing differential output signal currents by combining selected ones of the first pair of intermediate signals with selected ones of the second pair of intermediate signals; and

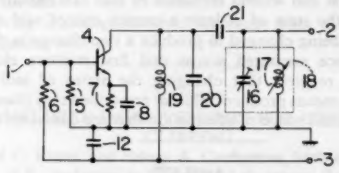
a matched pair of resistor means each coupled to the base of one of said second matched pair of common base transistors and coupled to a common reference voltage source for causing the second matched pair of transistors to form a zero substantially cancelling the dominant pole formed by the first matched pair of transistors.

4,048,578

R.F. AMPLIFIER CIRCUIT

Hiroshi Kimura, Nakaminato, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 27, 1976, Ser. No. 736,097
Claims priority, application Japan, Oct. 31, 1975, 50-130455
Int. Cl.² H03F *3/04*
U.S. Cl. 330—31 **2 Claims**



1. An R.F. amplifier circuit having an LC parallel tuning circuit at an output thereof comprising;

an R.F. choke coil connected between an output electrode of an amplifying transistor and a power supply and having a sufficiently low D.C. resistance,

a first capacitor connected between said output electrode and a ground across said amplifying transistor, and

a second capacitor connected between said output electrode and said LC parallel tuning circuit,

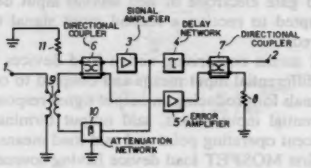
a resonance frequency of said first capacitor and said coil being selected to be sufficiently lower than a resonance frequency of said tuning circuit.

4,048,579

FEED-FORWARD AMPLIFIER

Rolf Christer Carlsson, Hagersten, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed July 26, 1976, Ser. No. 708,845
Claims priority, application Sweden, Aug. 28, 1975, 7509550
Int. Cl.² H03F *1/00*
U.S. Cl. 330—151 **8 Claims**



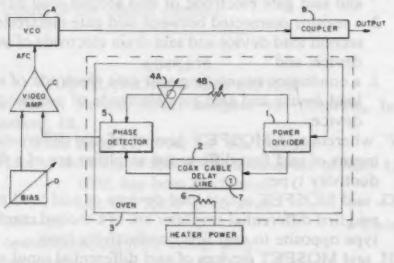
1. A feed-forward amplifier for receiving an input signal and emitting an output signal comprising: a main signal amplifier having an input port and an output port; first signal processing means for forming a difference signal between the received input signal and the signal at the output port of said main signal amplifier; dividing means for dividing the difference signal into first and second difference signal components and having first and second output ports for emitting the first and second difference signal components respectively; first connecting means for connecting the first output port of said dividing means to the input port of said main signal amplifier whereby the first difference signal component is fed to said main signal amplifier; and second signal processing means having first and second input ports and an output port for arithmetically combining the signals received at its input ports and emitting the result signal at its output port; second connecting means for connecting the output of said main signal amplifier to the first input port of said second signal processing means; and third connecting means for connecting the second output port of said dividing means to the second input port of said second signal processing means.

4,048,580

APPARATUS FOR DETECTING A STABLE MICROWAVE DISCRETE FREQUENCY

Richard A. Campbell, Concord; Richard A. Sparks, Bedford, and Robert W. Perry, Holliston, all of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 18, 1976, Ser. No. 733,629
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 R **2 Claims**



1. A system comprising a source of AC voltage; a power divider having an input and two outputs; said source of AC voltage being connected to the input of said power divider; a phase detector having first and second inputs and an output; first coupling means coupling the first output of said power

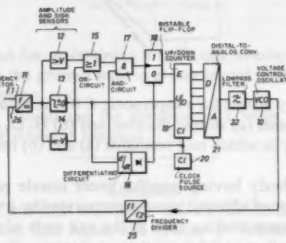
divider to the first input of said phase detector, said first coupling means being a series connected variable phase shifter and variable attenuator for providing signal alignment and compensation, and being phase insensitive to the frequency of said AC voltage; second coupling means connecting the second output of said power divider to the second input of said phase detector, said second coupling means being a phase stable coaxial cable having an electrical length determined by the periodicity of the frequency reference and the interferometer sensitivity, and having a phase variance in accordance with the variance of the frequency of said source of AC voltage; and an oven means for controlling the ambient temperature; said phase detector, power divider, first coupling means, and second coupling means being inclosed in said oven means.

4,048,581

OSCILLATOR FREQUENCY CONTROL LOOP

Bertil Lyberg, Akersberga, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 26, 1976, Ser. No. 690,145
Claims priority, application Sweden, June 17, 1975, 7506978
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—1 A **2 Claims**



1. An oscillator device comprising a voltage controlled oscillator having an output and a control input, a low-pass filter, a digital to analog converter having digital inputs and an analog output connected to said oscillator control input through said low-pass filter, a bidirectional counting means having digital outputs connected to the digital inputs on said digital-to-analog converter, said counting means comprising a clock pulse source, a clock pulse input connected to said pulse source, an activation input and an up/down control input for controlling the counting direction, frequency comparator means for comparing the frequency of a signal derived from the output of said voltage controlled oscillator and the frequency of a reference signal, said frequency comparator means generating a difference signal having an amplitude and sign which represent the difference between said signal and said reference signal, threshold means and sign indicating means sampling said difference signal for generating control signals to said activation input and said up/down control input respectively for enabling said clock pulse source to step said counting means in a compensating direction as the difference signal falls outside predetermined thresholds, and means for stopping the counter when the difference signal passes through a zero difference value.

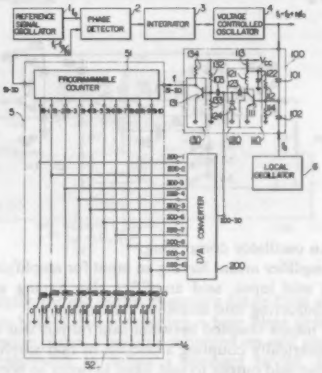
4,048,582

PHASE LOCKED LOOP SYNTHESIZER

Takashi Ihara, Yokohama, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 28, 1976, Ser. No. 736,580
Claims priority, application Japan, Oct. 31, 1975, 50-130328
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—16 **12 Claims**

1. A PLL synthesizer comprising a reference signal oscillator; a programmable counter means; a phase detector which detects a phase difference between the output frequencies from said counter means and said signal oscillator and obtains a d.c. voltage in accordance with said phase difference; a voltage controlled oscillator whose oscillation frequency is controlled by the d.c. voltage from said phase detector; a local oscillator; a frequency mixing and extracting means including at least a mixer, which mixes the outputs of said local oscillator and said voltage controlled oscillator and a tuning means which tunes at



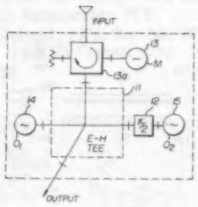
a prescribed frequency of the outputs of said mixer and lead the output to said programmable counter means; and a control means which detects a part of frequency division ratio setting digital input data from said programmable counter means and controls the frequency of said tuning means to be tuned to the mixed difference frequency of said mixer in accordance with the detected signal.

4,048,583

LOCKED HYBRID JUNCTION POWER COMBINER

Jan Nigrin, Edmonton, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed July 21, 1976, Ser. No. 707,194
Int. Cl.[2] H03B *9/12*
U.S. Cl. 331—56 **8 Claims**



1. A locked hybrid junction power combiner comprising:

a. a microwave hybrid junction having four ports, one of which acts as an output port,

b. three one port oscillators connected to the other three ports, one of the oscillators acting as a master oscillator and the other two as slave oscillators locked to the master,

c. a phase-shifting element positioned in one of the connections between one of the ports of the hybrid junction and an oscillator such as to provide an output that has correct phase relation and combines the powers of the three oscillators,

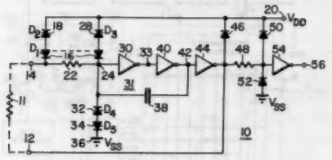
d. four port circulator positioned between the master oscillator and the appropriate arm of the hybrid junction.

4,048,584

INPUT PROTECTION CIRCUIT FOR CMOS OSCILLATOR

Richard Walter Ulmer, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 26, 1976, Ser. No. 745,022
Int. Cl.[2] H02H 7/20
U.S. Cl. 331—62 **8 Claims**



1. An oscillator comprising:

an amplifier means having an input for amplifying a potential at said input, said amplifier also having an output for conducting said amplified potential;

first means coupled between said output and said input for electrically coupling a portion of said amplified potential from said output to said input in order to boost said potential at said input; and

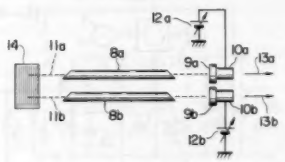
protective means coupled to said input for producing a high impedance at said input when said potential at said input is smaller in magnitude than the magnitude of said boosted potential at said input and for producing a low impedance at said input when said potential at said input is greater in magnitude than the magnitude of said boosted potential at said input.

4,048,585

TUNING TYPE LASER OSCILLATOR APPARATUS AND LASER RADAR SYSTEM AND LASER COMMUNICATION SYSTEM USING THE SAME

Kengo Murasawa, Yokohama, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 22, 1975, Ser. No. 624,985
Claims priority, application Japan, Oct. 23, 1974, 49-121411
Int. Cl.[2] H01S 3/10
U.S. Cl. 331—94.5 C **15 Claims**



1. A tuning type laser oscillator apparatus comprising:

a plurality of laser tubes each having a respective optical axis;

a plurality of reflection mirrors respectively located at a first end of each of said laser tubes;

first means, coupled to each of said reflection mirrors, for displacing each respective mirror in the direction of the laser tube axis at said first end of which said each respective reflection mirror is located; and

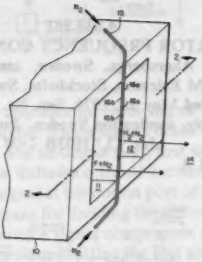
a wavelength selective element disposed at a second end of each of said tubes, opposite said first end, to intersect the optical axis of each of said laser tubes and reflecting a respective wavelength, within a respective range of optical wavelengths capable of being generated by said tubes, back through said tubes along the respective optical axes thereof.

4,048,586

CHEMICAL LASER WITH MIXING ENHANCEMENT DEVICE FOR POWER IMPROVEMENT

Arvel B. Witte, Rolling Hills; James E. Broadwell, Palos Verdes Estates, and Dale L. Hook, Rancho Palos Verdes, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jan. 12, 1976, Ser. No. 648,694
Int. Cl.[2] H01S 3/02, 3/095, 3/22
U.S. Cl. 331—94.5 D **8 Claims**



1. A cavity nozzle for a supersonic CW chemical laser fueled by the reactants (a) atomic fluorine and (b) H_2 D_2 and having a lasing cavity in which said reactants (a) and (b) react, comprising:

a nozzle body having parallel linear nozzle passages with each pair of adjacent passages separated by a wall tapering to a narrow trailing edge at the exit ends of said passages for injecting parallel contiguous streams of said reactants (a) and (b) from said passages, respectively, into said cavity along parallel linear paths at supersonic velocity in a manner such that each pair of contiguous streams of said reactants (a) and (b) have an intervening common mixing region; and

trip means comprising a plurality of trip fluid injection orifices spaced along each trailing wall immediately adjacent the edge between reactant nozzles with certain of the orifices opening toward one adjacent reactant stream path and the remaining orifices opening toward the other adjacent reactant stream path for injecting inert diluent fluid streams laterally into the respective reactant streams as the latter issue from their nozzle passages to induce turbulent-like fast mixing of the contiguous reactant streams within their respective boundary region.

4,048,587

BISMUTH HALIDE VAPOR LASER

Chi-sheng Liu, Monroeville, and Leiland A. C. Weaver, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 9, 1976, Ser. No. 703,739
Int. Cl.[2] H01S 3/00
U.S. Cl. 331—94.5 G **7 Claims**

1. In a laser apparatus for obtaining metal vapor laser transitions at temperatures substantially below the metal vaporization temperature, the combination of:

an enclosure,

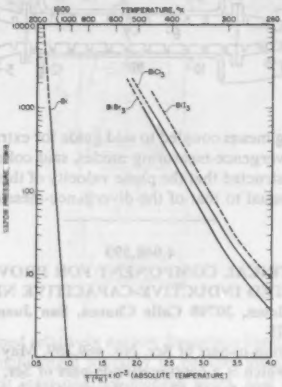
a bismuth halide selected from the group consisting of BiI_3, $BiCl_3$ and $BiBr_3$ within said enclosure,

means for vaporizing said bismuth halide by heating said bismuth halide to a temperature between approximately 300° C and 500° C while avoiding the formation of the metal dimer Bi_2,

means for dissociating the bismuth halide vapor for provid-

ing ground state bismuth metal atoms of sufficient number density to create resonance radiation trapping,

means for creating a population inversion between a desired upper laser level and a lower laser level of the bismuth by exciting ground state bismuth atoms with energized elec-



trons and for maintaining a sufficient number of bismuth atoms in the ground state to preserve said resonance radiation trapping, and

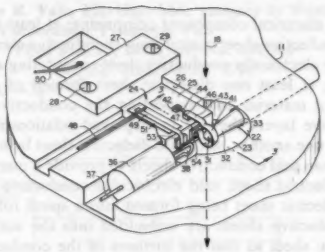
means for stimulating the emission of a beam of radiation from the inverted medium.

4,048,588

YIG-TUNED BULK SEMICONDUCTOR OSCILLATOR

Kurt E. Zublin, Los Altos, and Walter T. Wilser, Cupertino, both of Calif., assignors to Watkins-Johnson Company, Palo Alto, Calif.

Filed Apr. 8, 1976, Ser. No. 675,245
Int. Cl.² H03B *7/14, 9/12*
U.S. Cl. 331—96 **6 Claims**



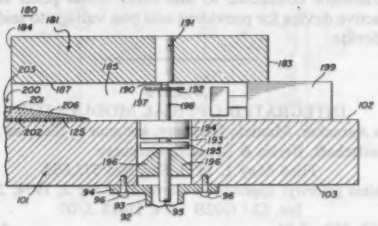
1. A diode oscillator comprising a support structure; an isolation cavity partly defined by said support structure; a diode subassembly mounted on said support structure, said subassembly including a semiconductor diode having two terminals, a conductive support pin for receiving and holding one terminal of said diode, a coupling loop carried by said support pin having one end secured to the other terminal of said diode, and a capacitor mounted on said conductive support pin for supporting and capacitively coupling the other end of the loop to the conductive support pin, said subassembly extending into the cavity; a resonator within said cavity disposed in coupled relationship to said loop; means for applying a uniform magnetic field to said resonator; and, an output loop disposed in said cavity and oriented orthogonally with respect to said input loop and serving to be coupled to the electromagnetic fields at said resonator to provide an output.

4,048,589

RECEIVER MODULE AND COMPONENTS THEREOF

Robert M. Knox, La Grange, and Peter P. Toulios, Westchester, both of Ill., assignors to Epsilon Lambda Electronics Corporation, Batavia, Ill.

Division of Ser. No. 592,065, June 30, 1975, Pat. No. 3,995,238. This application Nov. 8, 1976, Ser. No. 739,614
Int. Cl.² H03B *5/18, 7/14*
U.S. Cl. 331—107 R **6 Claims**



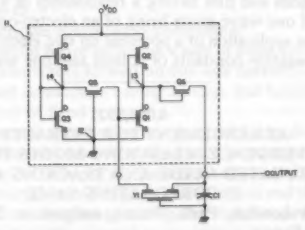
1. An oscillator for use in the frequency range from about 1 GHz to about 1,000 GHz comprising a base plate defining a conductive image plane, a housing mounted on said plate and cooperating therewith to define a resonant cavity, an IMPATT diode mounted within said cavity and having a bias connection therefor extending from said cavity, an elongated high permittivity dielectric waveguide of finite cross section adjacent to said image plane and extending into said cavity, and a thin film of synthetic organic resin disposed between and secured to both said image plane and said dielectric waveguide and extending laterally thereof, said thin film being low loss in character and having a low permittivity compared with that of said dielectric waveguide, the ratio between the thickness of said thin film and the square root of the cross-sectional area of said dielectric waveguide being in the range from about 0.02 to about 1.0, the end of said dielectric waveguide extending into said cavity being tapered toward said diode to provide impedance matching and mode transformation of the energy transmitted between said cavity and said dielectric waveguide.

4,048,590

INTEGRATED CRYSTAL OSCILLATOR CIRCUIT WITH FEW EXTERNAL COMPONENTS

Daniel W. Dobberpuhl, Liverpool, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 21, 1976, Ser. No. 707,275
Int. Cl.² H03B *5/36*
U.S. Cl. 331—116 R **4 Claims**



1. A semiconductor integrated circuit comprising:

a current path including a first current limiting device serially connected with an active device, the connection between said devices being a nodal point;

a current mirror circuit connected in electrical parallel relationship with said current path for providing a bias voltage to said active device separately and independently of

said current path, said current mirror circuit including second and third current limiting devices serially connected together, the connection therebetween being another nodal point, which other nodal point provides the bias voltage substantially identical to the bias voltage at said one nodal point;

a frequency controlling element operatively connected to said active device for causing said active device to oscillate at a frequency determined by said frequency controlling element; and

a transistor connected to said other nodal point and said active device for providing said bias voltage to said active device.

4,048,591

INTEGRATED OPTICAL MODULATOR

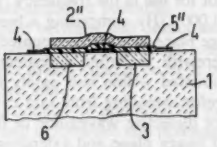
Franz Auracher, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 1, 1975, Ser. No. 573,553

Claims priority, application Germany, May 2, 1974, 2421285

Int. Cl.² G02B *5/14*; H01S *3/00*

U.S. Cl. 332—7.51 **4 Claims**



1. An integrated optical modulator for modulating optical signals in dielectric wave guides comprising a substrate having a surface and being of a material having an index of refraction n_3; at least two parallel extending electrodes being disposed in spaced relationship on said surface; a first wave guide disposed on said surface between two of said parallel extending electrodes and extending parallel thereto, said first wave guide having an upper surface and an index of refraction n_1; a dielectric, low loss film having an index of refraction n_4, said film being disposed on the upper surface of the first wave guide and covering same; a second wave guide having an index of refraction n_2, said second wave guide being disposed on said film, and a third wave guide being disposed in spaced, parallel relationship and adjacent one of said first and second wave guides, the other of said first and second wave guides having a width approximately equal to the sum of the widths of the third wave guide, said one wave guide and the space therebetween, said film having a width at least as large as the other wave guide so that the film separates the other wave guide from said one and third wave guides, said indices of refraction of the wave guides and film having a relationship of $n_4 < n_1, n_2$, at least said one wave guide being of an electro-optical material so that an application of a potential on said electrodes changes the propagation constants of at least said one wave guide.

4,048,592

ARRANGEMENT FOR EXTRACTING DIVERGENCE-MEASURING MODES FROM A CORRUGATED GUIDE AND TRACKING ANTENNA INCORPORATING SAME

Serge Drabowitch, Paris, France, assignor to Thomson-CSF, Paris, France

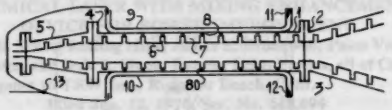
Filed Feb. 26, 1976, Ser. No. 661,821

Claims priority, application France, Feb. 28, 1975, 75.06254

Int. Cl.² H01P *5/08, 3/12*; H01Q *13/06*; H01P *1/16*

U.S. Cl. 333—6 **15 Claims**

1. An arrangement for extracting divergence-measuring modes propagating in a corrugated guide having a wall with an inner surface provided with a multiplicity of transverse grooves having a depth of the order of a quarter wavelength of an operating frequency, said grooves being spaced apart by a fraction of said wavelength, said divergence-measuring modes being upper-odd modes derived from a hybrid fundamental mode propagated along said guide, said arrangement comprising collecting means coupled to said guide for extracting therefrom said divergence-measuring modes, said collecting means being so constructed that the phase velocity of their fundamental mode is equal to that of the divergence-measuring modes.



4,048,593

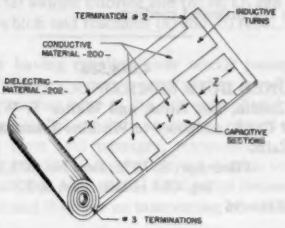
ELECTRICAL COMPONENT FOR PROVIDING INTEGRATED INDUCTIVE-CAPACITIVE NETWORKS

Jack H. Zillman, 30798 Calle Chueca, San Juan Capistrano, Calif. 92675

Continuation-in-part of Ser. No. 469,359, May 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 412,827, Nov. 5, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 620,967

Int. Cl.² H03H *7/04, 13/00*; H01G *4/40, 4/32*

U.S. Cl. 333—70 R **5 Claims**



1. An electrical component comprising: at least one electrically conductive sheet constituting an inductive element and at least one electrically conductive sheet constituting a capacitive element; at least one dielectric sheet formed of electrically insulating material and supporting the conductive sheets as conductive layers thereon in displayed relationship with respect to one another, with said dielectric sheet being generally larger than said conductive sheets to provide a margin area on said dielectric sheet, said electrically conductive sheets and said dielectric sheet being formed into a spiral roll, in which the conductive sheets are embedded into the surface of the dielectric sheet so that the surfaces of the conductive sheets and the dielectric sheet are flush with one another.

4,048,594

SURFACE ACOUSTIC WAVE FILTER

Rolf D. Weglein, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jan. 2, 1976, Ser. No. 646,093

Int. Cl.² H03H *9/26, 9/04*; H01L *41/10*

U.S. Cl. 333—72 **1 Claim**

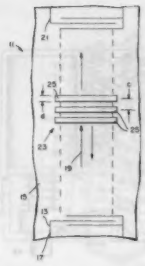
1. A surface acoustic wave filter comprising:

a substrate of material capable of supporting propagating surface acoustic wave energy;

input means including an input transducer disposed on said substrate for converting electromagnetic energy to surface acoustic wave energy in said substrate and for causing said surface wave energy to propagate along a first path;

output means including an output transducer disposed on said substrate for converting surface acoustic wave energy incident thereon to output electromagnetic energy; and

periodic metallic grating means disposed on said substrate in said first path for reflecting a predetermined fraction of surface wave energy from said input transducer in a predetermined relatively narrow frequency band, said grating means including a plurality of parallel metallic elements spaced at least one wavelength apart, said metallic elements being perpendicular to the direction of said first path the reflected energy propagating back toward said input transducer in a reactive mode of operation.

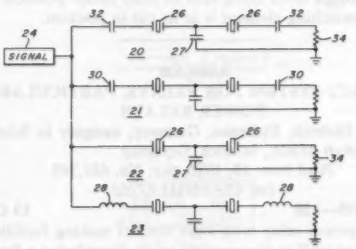


4,048,595

INFORMATION EXTRACTION FOR DOPPLER RADAR

Christopher R. Vale, Elkridge, Md., assignor to Westinghouse Electric Corporation, Pittsbugh, Pa.

Filed Jan. 22, 1976, Ser. No. 651,305
Int. Cl.[2] H03H *9/32, 7/48*
U.S. Cl. 333—72 **6 Claims**



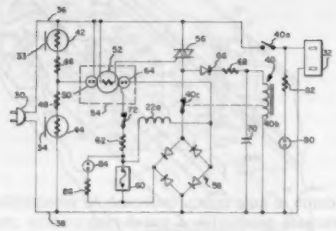
1. A crystal filter array comprising a plurality of individual two-pole bandpass filter networks directly connected together for connection in parallel to a single signal source, each of said filter networks including two crystal resonators connected in series and a capacitor connecting the junction between the resonators to ground, all of the crystals in all of the networks being identical, and reactance means connected in the circuit of at least some of said networks in a manner to modify the frequency response of the network, said reactance means being different in each network.

4,048,596

LIGHT-ACTIVATED REMOTE CONTROL UNIT

Eric A. Kolm, Brookline, Mass., and Robert R. Trottier, Woonsocket, R.I., assignors to Signal Science Systems, Inc., Framingham, Mass.

Filed Apr. 17, 1975, Ser. No. 568,938
Int. Cl.[2] H01J *39/12;* **H01H** *47/24, 47/32*
U.S. Cl. 334—8 **9 Claims**



1. An appliance control unit for effecting one or more control operations on an appliance, said control unit comprising

A. first and second photocell units arranged to be substantially equally responsive to ambient household optical radiation, said photocell units including first and second photoconductive cells, respectively, connected in series to a voltage source,

B. detection means including

1. a gaseous discharge first lamp connected across said first photocell so as to be ignited when radiation is preferentially applied to the second photocell, and

2. a third photoconductive cell arranged to respond to light from said first lamp and thereby provide an initiating signal in response to preferential illumination of said second photocell, and

C. a control device

1. for connection to said appliance so as to perform a control operation thereon, and

2. for performing said control operation in response to said initiating signal.

4,048,597

PLANAR PRINTED CIRCUIT BOARD ARRANGEMENT USEFUL IN THE UHF PORTION OF A TELEVISION TUNER

Stanley Paul Knight, Cranbury, N.J., and Thomas Edward Molinari, Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed June 28, 1976, Ser. No. 700,121
Int. Cl.[2] H03J *3/18*
U.S. Cl. 334—15 **10 Claims**

1. In a tuner, the combination comprising:

a printed circuit board including a slab of dielectric material having conductors formed on one side thereof;

a first of said conductors having an edge and being coupled to a source of fixed potential;

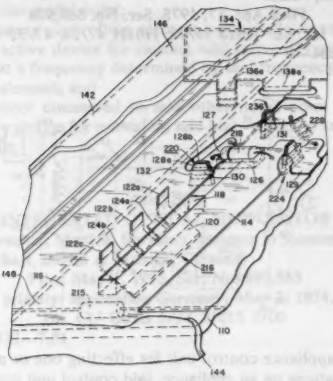
a strip-like conductor having an edge parallel to the edge of said first conductor and spaced at a proximate distance therefrom to define a gap between said conductors, said strip-like conductor being connected at one end thereof to said first conductor, said strip-like conductor having a length and width selected to provide an inductive reactance in the UHF band;

said printed circuit board having a slot formed therethrough in an area including at least a portion of said gap, a portion of said first conductor and a portion of said strip-like conductor to define the position of said one end of said strip-like conductor;

said printed circuit board having a component mounting aperture formed therethrough in an area including an-

other portion of said strip-like conductor to define the position of the other end of said strip-like conductor;

a discrete component mounted in said component mounting aperture; and



at least another discrete component mounted on the side of said printed circuit board opposite said conductors having leads thereof connected to respective ones of said conductors.

4,048,598

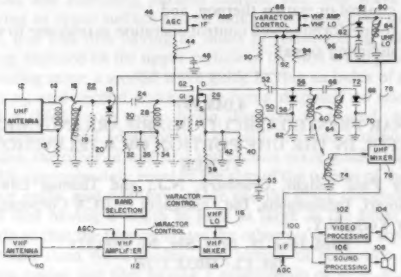
UHF TUNING CIRCUIT UTILIZING A VARACTOR DIODE

Stanley Paul Knight, Cranbury, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 28, 1976, Ser. No. 691,189

Int. Cl.[2] H03J *3/18, 3/24;* H03H *7/38*

U.S. Cl. 334—15 **7 Claims**



1. In a UHF tuner, the apparatus comprising:

a tuned circuit including a varactor diode;

a field effect transistor having a plurality of electrodes including a gate electrode;

an impedance transformation means coupled between said tuned circuit and said gate electrode of said field effect transistor, said impedance transformation means including capacitance means coupled in series between said tuned circuit and said gate electrode and inductance means coupled in shunt with said gate electrode, said capacitance means and said inductance means being selected to provide a resonant frequency below the lowest channel frequency in the UHF range so that the impedance coupled to said gate electrode is approximately matched with the impedance of said field effect transistor at said gate electrode at the low end of the UHF range and the power gain of said apparatus at the low end of said UHF range is approximately equal to the power gain of said apparatus at the high end of said UHF range.

4,048,599

ELECTRIC SWITCHING DEVICE

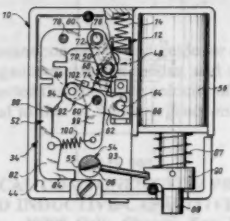
Otto Groth, Tailfingen, Germany, assignor to Elektra Tailfingen Ammann & Cie, Tailfingen, Germany

Continuation of Ser. No. 568,028, April 14, 1975. This application May 10, 1976, Ser. No. 684,490

Claims priority, application Germany, Apr. 19, 1974, 2419038

Int. Cl.[2] H01H *83/00*

U.S. Cl. 335—20 **13 Claims**



1. An electric switch that automatically opens when the voltage carried by the switch falls below a predetermined value comprising, in combination,

a switching element linearly movable along the direction of its longitudinal axis between a cut-in position that closes the switch and a cut-out position that opens the switch and is biased toward its cut-out position,

control means having an electromagnet electrically connected in series with the switch,

a release lever actuated by said control means to move from a first position to a second position when the voltage energizing said electromagnet falls below said predetermined value,

a blocking mechanism operating with said release lever and said switching element to move from a blocking position in which it maintains the switching element in said cut-in position to a release position in which it allows said switching element to move to said cut-out position in response to said release lever moving from said first position to said second position, and

a selector shaft and a first toggle lever acting independently of the blocking mechanism and operatively connecting said selector shaft and said switching element to drive said switching element between said cut-out and cut-in positions in response to a rotation of said selector shaft, said first toggle lever being near its dead center position when said switching element is in its cut-in position.

4,048,600

CONTACT SYSTEM FOR RELAYS, PARTICULARLY POWER RELAYS

Bernhard Dietrich, Eichenau, Germany, assignor to Schaltbau Gesellschaft MBH., Munich, Germany

Filed Nov. 13, 1975, Ser. No. 631,745

Int. Cl.[2] H01H *67/02*

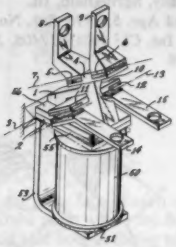
U.S. Cl. 335—128 **13 Claims**

1. In a power relay with twin contact making facilities for energized as well as unenergized relay, there being a first pair of stationary contacts for contact making when the relay is energized and a second pair of stationary contacts for contact making when the relay is de-energized, the relay including an armature and a core/coil structure for attracting the armature upon energization of the core/coil structure, the improvement comprising:

a first pair of contacts on the armature and being spaced along a first line which extends at right angles to the direction of movement of the armature upon energization of the core/coil structure, said first pair of stationary contacts being arranged respectively for contact making

with the contacts of the first pair of contacts on the armature;

a second pair of contacts on the armature being arranged in a plane different from any plane through the first line, and at right angles to the direction of armature movement, and on a side of the first line opposite said first pair of stationary contacts, said second pair contacts being spaced along a second line which does not intersect but extends at right



angles to said first line when projected into a common plane, further extending at right angles to the direction of movement of the contacts of the second pair, said second pair of stationary contacts being arranged respectively for contact making with the contacts of the second pair of contacts on the armature; and

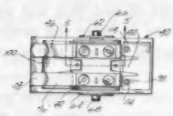
the armature being disposed for pivot motion on an axis which extends parallel to the second line.

4,048,601

SWITCH MOUNTING ASSEMBLY FOR AN ELECTROMAGNETIC RELAY

John C. Schuessler, West Covina, and David J. Tapp, Manhattan Beach, both of Calif., assignors to Leach Corporation, Los Angeles, Calif.

Filed May 28, 1976, Ser. No. 691,003
Int. Cl.² H01H *50/30*
U.S. Cl. 335—193 **10 Claims**



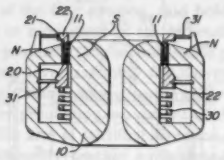
1. A contact blade assembly for a relay or the like comprising a magnetic armature, a contact blade, an insulating contact carrier positioned between the armature and the contact blade, means securing the contact blade to the carrier, the carrier having a pair of recesses formed along opposite margins, and clamping means secured to the armature having cantilevered spring fingers projecting toward each other, the inner end of the fingers engaging said recesses in the carrier for holding the carrier against the armature.

4,048,602

UNIVERSAL IMPEDANCE POWER APPARATUS

Nick D. Diamantides, 2517 14th St., Cuyahoga Falls, Ohio 44223

Filed June 30, 1975, Ser. No. 591,297
Int. Cl.² H01F *7/08*
U.S. Cl. 335—222 **22 Claims**



1. A multimpeder as described comprising in combination

a magnet, said magnet being a permanent magnet having two opposite magnetic poles separated by an air gap, said air gap being traversed by the magnetic field created by said poles, said magnetic field being substantially orthogonal to the faces of said poles,

an armature movably positioned within said air gap, said armature being equipped with a main coil capable of carrying an alternating current, said main coil being within said magnetic field, said armature and main coil being capable of a translational reciprocating motion, said motion having a direction substantially perpendicular to said magnetic field,

a spring supporting said armature and resiliently opposing said armature's motion,

said armature having a mass, and said spring having a resilience, said mass and said resilience being selected as to cause said armature-spring system to be maintained at a desired level of vibratory state at the frequency of said alternating current,

centering means allowing said translational reciprocating motion of said armature, but preventing a motion of said armature parallel to said magnetic field, said centering means maintaining a fixed distance between said armature and said magnetic poles,

said air gap being filled with a ferrofluid, said ferrofluid reducing the magnetic reluctance of said air gap, and adding a viscous force opposing said reciprocating motion of said armature.

4,048,603

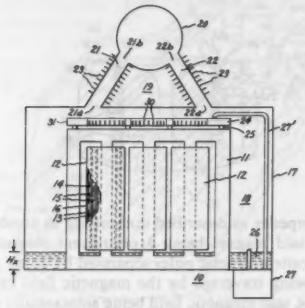
VAPORIZATION COOLED TRANSFORMER

Fred W. Staub, and Heinz Jaster, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,827
Int. Cl.² H01F *27/10*
U.S. Cl. 336—57 **3 Claims**

1. A hermetically sealed vaporization chamber containing heat producing electrical apparatus to be cooled while dielectrically protected and two phase dielectric fluid comprising a liquid and a vapor, said apparatus including a plurality of cooling ducts extending vertically therethrough, said liquid residing at a bottom portion of the chamber and having a liquid level above the bottom of the chamber, said liquid also being distributed as a film which coats the top and the wall surfaces of the vertical ducts, said vapor being produced by vaporization of said liquid by said heat produced by said apparatus, said vapor occupying space in said chamber above said liquid level, a condenser having one end thereof connected to and communicating with an upper portion of said vaporization chamber occupied by said vapor, a reservoir containing a predetermined mass of non-condensable dielectric gas positioned above said condenser, said condenser having another end connected to and communicating with said reservoir and said gas therein,

said gas forming an interfacial contact with said vapor in said condenser at a region therein between said ends of said condenser, said vapor condensing to form liquid condensate in the condenser on one said interfacial contact so that the effective condensation area of said condenser lies between said one end of said condenser and said interfacial contact; distribution means in said chamber positioned above said electrical appara-



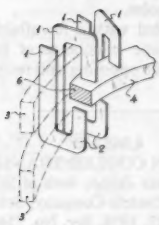
tus for receiving liquid condensate from said condenser, said distribution means comprising a distribution pan with an outer rim, the rim portion of the distribution pan provided with a plurality of apertures to distribute the liquid condensate uniformly as a film over the wall surfaces of the associated vertical ducts, and at least one condensate make-up pump for pumping liquid from the bottom portion of the chamber to said distribution means.

4,048,604

MAGNETIC CORE

Francisco Arjona Vallet, Trav. Jose Antonio No. 1, Avila, Spain

Filed Mar. 25, 1976, Ser. No. 670,356
Claims priority, application Spain, Mar. 25, 1975, 436016
Int. Cl.[2] H01F *27/24*
U.S. Cl. 336—83 **1 Claim**



1. An improved construction of an electric inductance apparatus, comprising flat magnetic plates joined together to form a toroidal core, said toroidal core having an internal compartment accommodating inductance coils and an annular air gap between said coils, the improvement resulting in enhanced regulation of the mutal inductance of said inductance coils by forming a magnetic shunt between said inductance coils, said improvement comprising:

said flat magnetic plates being shaped to form a lateral air gap groove adjacent to and leading into said compartment within said toroidal core, and

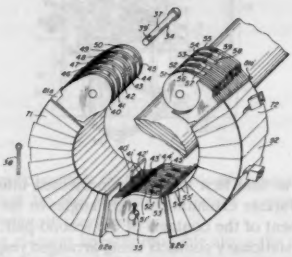
said compartment within said toroidal core being penetrated through said lateral air gap by an open hoop of magnetic material having a thickness of sufficient dimension to enable said open hoop to penetrate into said compartment with said throidal core, said open hoop, being positioned between said inductance coils within said compartment, and the external diameter of said open hoop being of sufficient dimension to penetrate into said compartment and into said annular air gap between said inductance coils while leaving an air gap between a wall of the internal compartment and the outer periphery of said hoop.

4,048,605

SPLIT CORE CURRENT TRANSFORMER HAVING AN INTERLEAVED JOINT AND HINGE STRUCTURE

Samuel C. McCollum, Springfield, Ill., assignor to Sangamo Electric Company, Springfield, Ill.

Filed Apr. 5, 1976, Ser. No. 674,035
Int. Cl.[2] H01F *17/06, 27/24*
U.S. Cl. 336—176 **1 Claim**



1. In a split core current transformer having first and second arcuate core sections made of lamination members engageable at their respective ends to provide a core structure having a generally circular magnetic path with air gaps located only at the two respective ends of the core sections, the lamination members of the first and second core sections being identical in shape, each of said laminations having a main body portion with a head portion at one end thereof which terminates in a rounded convex end surface and a tail portion at the opposite end thereof which terminates in a rounded concave end surface, the width of the portion of each core section at said first and second ends thereof being greater than the width of the main body intermediate said first and second ends, a first winding wound on the main body portion of said first core section and a second winding wound on the main body portion of said second core section, said first core section and said second core section each hving a first group and a second group of said laminations, the ends of the laminations in adjacent groups projecting alternately from one another to provide staggered projections which extend outwardly at each end of the core to interleave with corresponding projections on the other core section, the width of the projecting portions of the lamination groups which interleave being greater than the width of the main body portion to provide an increased area of magnetic permeable material in the region of the two core air gaps, and hinge means extending through the interleaved projections of increased width at one end of said core section to permit relative pivotal movement of said first and second core sections about said hinge means to bring the projections of increased width at the other end of the first and second cores into interleaved relation.

4,048,606

INDUCTIVE DEVICE WITH BOBBIN

Imrich M. Miller, Paterson, N.J., assignor to Universal Manufacturing Corporation, Paterson, N.J.

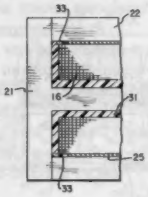
Continuation of Ser. No. 580,015, May 22, 1975, abandoned.
This application Oct. 5, 1976, Ser. No. 729,816
Int. Cl.[2] H01F *27/30*
U.S. Cl. 336—198 **1 Claim**

1. An inductive device comprising in combination:

lamination means defining an open window,

a bobbin of electrically insulating material having a core

with a multi-sided polygonal flange on each of its ends, each of said flanges being of a heat settable thermoplastic material and integrally formed with a continuous peripheral stiff edge on at least two of its sides which stiff edge initially extends outwardly from and is thinner than the other portion of the respective flange, the flanges being reduced in thickness on the respective inner faces thereof to form the thinned down edge, a coil of wire on said core



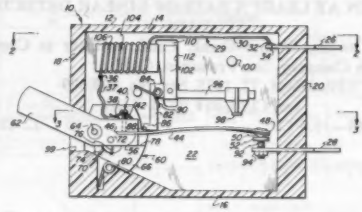
which extends to the inner face of each of said flanges and substantially up to the point where the thinned edge of the flange commences, said bobbin fitting within said lamination window with the thinned down continuous edges of the respective flange heat set and bent over the coil on the bobbin core and said bent down edges lying directly adjacent the corners of the window to reduce the electrical creepage path between the coil and the inner face of the lamination at the corners of the window.

4,048,607

CIRCUIT BREAKER

Adam Smorzaniuk, West Millington, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed June 24, 1976, Ser. No. 699,366
Int. Cl.[2] H01H 73/48
U.S. Cl. 337—53 **15 Claims**



1. A circuit breaker for opening a circuit in response to a given temperature change and capable of being reset manually, said circuit breaker comprising:

a frame;

a first contact member affixed to the frame;

an actuating lever assembly mounted upon the frame for pivotal movement between a first position and a second position;

a bimetallic arm carried by the actuating lever assembly for pivotal movement therewith and having a first end affixed to the actuating lever assembly and a second end juxtaposed with the first contact member, the bimetallic arm having a bistable configuration conformable to either one of first and second stable postures such that the second end rests at either one of corresponding first and second locations relative to the first end, the second end being movable in a first direction relative to the first end in response to said given temperature change to effect movement of the bimetallic arm with a snap-action along a prescribed path of travel between the first stable posture and the second stable posture and conform the bimetallic arm to the second stable posture;

a second contact member located adjacent the second end of the bimetallic arm such that the first and second contact members are engaged and the circuit is closed when the actuating lever assembly is in the first position and the bimetallic arm is in the first stable posture, and the contact members are disengaged, and the circuit is open, when the bimetallic arm is in the second stable posture;

resilient biasing means biasing the actuating lever assembly toward the second position;

holding means for maintaining the actuating lever assembly stationary at the first position, said holding means being responsive to movement of the bimetallic arm from the first stable posture to the second stable posture to release the actuating lever assembly for movement toward the second position in response to the biasing means; and

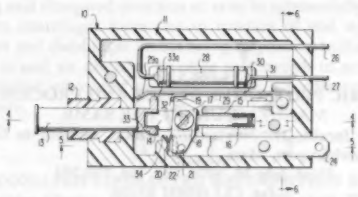
stop means for precluding movement of the second end of the bimetallic arm in said first direction when the actuating lever assembly reaches an intermediate position between said first and second positions, while permitting continued pivotal movement of the actuating lever assembly to the second position to move the first end of the bimetallic arm relative to the second end and conform the bimetallic arm to the first stable posture, whereby return of the actuating lever assembly to the first position thereof will again engage the first and second contact members.

4,048,608

CIRCUIT BREAKER

William P. Riendeau, Leonardtown; Robert R. Blevins, Lexington Park, and Joseph L. Abell, California, all of Md., assignors to Aiken Industries, Inc., New York, N.Y.

Filed Nov. 25, 1975, Ser. No. 635,013
Int. Cl.[2] H01H 71/16
U.S. Cl. 337—74 **10 Claims**



1. A double break circuit breaker having ambient compensation and automatic overload current protection comprising:

a hollow casing;

a reset means having a longitudinal axis disposed in said casing for linear movement between an inward and an outward position;

biasing means in said casing for urging said reset means in said outward direction;

a rocker arm pivotally supported on said reset means for rotation about an axis perpendicular to the direction of movement of said reset means;

contact means, disposed in said casing, for providing an electrical path through said circuit breaker when bridged;

a contact bridging bar, mounted on one end of said rocker arm, for bridging said contact means and providing an electrical path through said circuit breaker, said contact bridging bar having a longitudinal axis parallel with the axis of rotation of said rocker arm and being loosely mounted in said rocker arm and freely rotatable about said longitudinal axis;

a trip latch disposed in said casing and engageable with the other end of said rocker arm; and

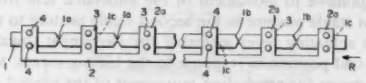
means for causing said trip latch to release said rocker arm so as to move said contact bridging bar away from said contact means in response to an electric current through the circuit breaker exceeding a predetermined value.

4,048,609

LATTICE STRUCTURE FOR ELECTRIC FUSES COMPRISING FUSIBLE ELEMENTS AND INSULATING SUPPORTS THEREFOR

Edward J. Knapp, Jr., Amesbury, Mass., assignor to The Chase-Shawmut Company, Newburtport, Mass.

Filed Feb. 17, 1976, Ser. No. 658,736
Int. Cl.[2] H01H *85/04, 85/14*
U.S. Cl. 337—159 5 Claims



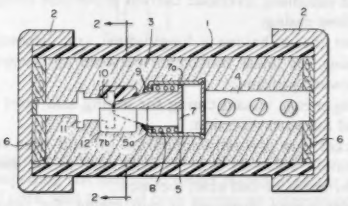
1. A sub-assembly for manufacturing electric fuses including
a. a fusible element in form of a ribbon having a plurality of serially related points of drastically reduced cross-sectional area each formed by a pair of juxtaposed substantially V-shaped incisions;
b. a substantially planar strip of electric insulating material arranged in spaced relation from, and substantially parallel to, said fusible element; and
c. said strip having a plurality of arms projecting transversely therefrom and supporting said fusible element at points situated to opposite sides of pairs of said substantially V-shaped incisions.

4,048,610

ELECTRIC PROTECTIVE DEVICE AND PROCESS OF MANUFACTURING THE SAME

Philip C. Jacobs, Jr., Newtonville, Mass., assignor to Gould, Inc., Newburyport, Mass.

Filed July 30, 1976, Ser. No. 710,251
Int. Cl.[2] H01H *85/38*
U.S. Cl. 337—165 4 Claims



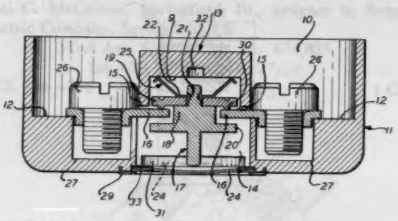
1. An electric protective device including in combination
a. a cylinder;
b. a plunger inside said cylinder;
c. a helical spring having ends resting against said cylinder and said plunger and biasing said plunger to move into said cylinder;
d. heater means connected by a solder joint to said plunger; and
e. a body of a material evolving gases under the heat of an arc in physical engagement with said solder joint, portions of said plunger, and portions of said heater means to evolve an arc-quenching jet of gas upon melting of said solder joint and initiation of an arc.

4,048,611

THERMAL SWITCH

Walter J. Kuczynski, 871 Pennsylvania Ave., and Robert A. Kuczynski, 1075 W. Chestnut St., both of Union, N.J. 07083

Filed June 23, 1976, Ser. No. 699,201
Int. Cl.[2] H01H *37/52*
U.S. Cl. 337—380 9 Claims



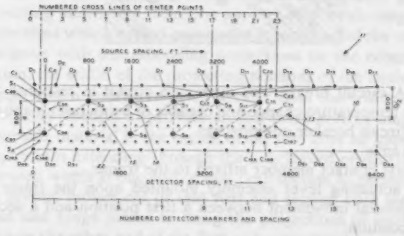
1. A thermal switch comprising:
a. a housing with an open hollow portion at one end,
b. the end of the hollow portion defining a floor,
c. an enlargement on the floor extending into the hollow portion,
d. a cavity at the other end of the housing, extending into the enlargement,
e. a pair of opposed slots communicating between the hollow portion of the housing, through the enlargement into the cavity,
f. a switch means in the cavity responsive to temperature change.

4,048,612

EXPLORATION SYSTEM FOR CROSS-STEERING AND STACKING SEISMIC DATA USING A SAWTOOTH TRAVERSE OF SHOT POINTS CENTRALLY SPACED BETWEEN AT LEAST A PAIR OF LINEAR DETECTOR SPREADS

Leon C. Lawyer, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sept. 12, 1975, Ser. No. 613,009
Int. Cl.[2] G01V *1/16, 1/20*
U.S. Cl. 340—15.5 CP 12 Claims



1. A seismic exploration method where seismic impulses are generated successively, one pulse at each of a plurality of source point locations along an asymmetrical sawtooth shot point line, having a stepped segment defining an offset spacing distance (*d*), between adjacent source point locations, and where seismic waves resulting from each of said impulses are detected by at least two detector spreads each containing a plurality of detectors spaced at a series of in-line detector locations, adjacent spreads being offset from each other a distance D, which is related to said source point spacing distance (*d*) by a ratio of 2:1 or greater which comprises:
i. statically and dynamically correcting detected seismic signals so as to produce a series of corrected traces, said series of corrected traces containing sets of common

traces associated with common centerpoints of a two-dimensional grid of centerpoints formed between particular source point location and detector spread location pairs, and cross-sets of traces associated with cross-lines of centerpoints of said grid, at least one trace of each set of common centerpoint traces being a product of a source-detector pair having a substantially different horizontal spacing than at least one other source detector pair of other common traces associated with said same set of common centerpoint traces,

ii. stacking said sets of common traces to produce stacked traces having improved primary-to-multiple ratios which improve the portrayal of multifold areal surface structural conditions, and

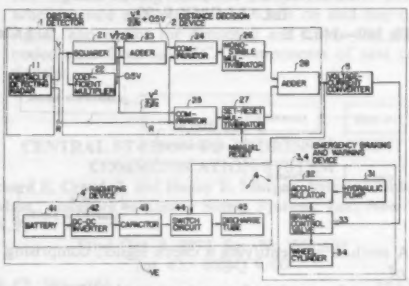
iii. beam-steering said stacked traces to produce subsets of cross-directional traces having improved directional content and signal-to-noise ratios.

4,048,613

ALARM SYSTEM FOR EMERGENCY BRAKING

Hajime Ito; Teruo Yamanaka, both of Toyota, and Osamu Ozeki, Nagoya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Feb. 21, 1975, Ser. No. 551,719
Claims priority, application Japan, July 24, 1974, 49-84149
Int. Cl.² G08G *1/00*
U.S. Cl. 340—53 **6 Claims**



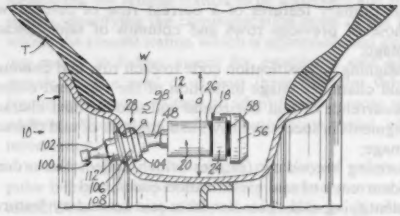
1. For a vehicle emergency braking device which includes a speed and distance detecting device, and which automatically operates to perform an emergency braking action in response to one of a first set of relative speeds and relative distances between the vehicle and an object in the path of the vehicle and which remains inactive insofar as emergency braking is concerned in response to a second set of relative speeds and relative distances, an alarm system comprising: decision means responsive to the first and second sets of relative speeds for determining a first distance from the object at which an emergency braking action would occur, control means responsive to the first and second sets of relative speeds and coupled to the decision means for producing an output signal representing a second distance greater than the first distance, and signal means coupled to said control means and responsive to said detecting device for issuing an alarm signal for vehicle passengers in response to a distance signal from the detecting device being less than the second distance, said signal means ending the alarm signal prior to the emergency braking action and thereafter maintaining the alarm signal inactive will onset of an emergency braking action, the duration of the alarm signal being less than the time from the end of the signal until the onset of the emergency braking action.

4,048,614

LOW TIRE PRESSURE WARNING DEVICE

Harry J. Shumway, Clark Road, Naugatuck, Conn. 06770

Filed Jan. 5, 1977, Ser. No. 757,052
Int. Cl.² B60C *23/04*
U.S. Cl. 340—58 **6 Claims**



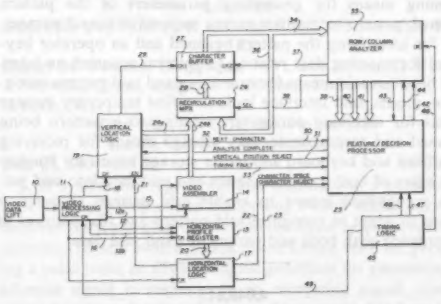
1. A tire pressure alarm system for a vehicle having a wheel with a rim forming an annular well of a predetermined depth, said rim being adapted to receive a tire to form therewith an airtight chamber, said rim having an air inlet valve having a first end outside said airtight chamber and a second end inside said airtight chamber, said alarm system including an elongated operative component adapted to be removably connected to said second end and located entirely within said airtight chamber, so that the elongated direction of said operative component is substantially parallel to the axis of rotation of said wheel, said operative component including an air chamber adapted to receive air from said airtight chamber, said operative component further including an actuable radio transmitter and power source therefor situated within the air chamber, and a switch and diaphragm means, said switch being situated along said elongated direction so as to be substantially impervious to centrifugal force due to rotation of said wheel, said switch and diaphragm means being responsive to the air pressure in said air chamber to close said switch to actuate said transmitter when said air pressure is at a predetermined low pressure.

4,048,615

AUTOMATED CHARACTER RECOGNITION SYSTEM

Ping-chien Chuang, Irving, and Joseph A. Plunkett, Plano, both of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed June 4, 1976, Ser. No. 692,767
Int. Cl.² G06K *9/12*
U.S. Cl. 340—146.3 AC **10 Claims**



1. A method of detecting printed characters of plural fonts interspersed on a document surface, which comprises:

a. sensing a character and storing a two-dimensional electronic character image thereof;

b. scanning each row of said character image to detect horizontal primary features including the number of horizon-

tal character segments, and the segment length and rightmost segment coordinate for rows having a single horizontal character segment;

c. scanning each column of said character image to detect vertical primary features including the number of vertical character segments, and the segment length for those columns having a single vertical segment;

d. comparing said horizontal primary features and said vertical primary features of a current row of column with those of previous rows and columns of said character image;

e. assigning a classification code to each row and column of said character image indication of the type and order of occurrence of said horizontal and said vertical character segments in successive rows and columns of said character image;

f. forming secondary features which reflect the order of occurrence of said classification codes; and

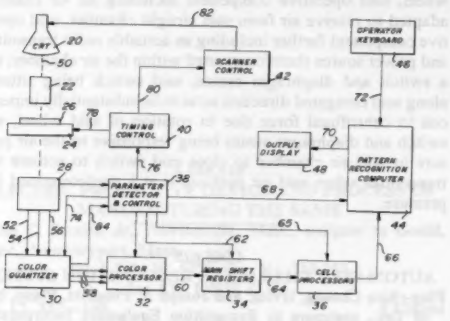
g. identifying said character from said secondary features.

4,048,616

PATTERN RECOGNITION SYSTEM WITH KEYBOARD ENTRY FOR ADAPTIVE SENSITIVITY

Donald J. Hart, Merion; John C. Bouton, Jr., Doylestown, and Eugene H. Poppel, Philadelphia, all of Pa., assignors to Geometric Data Corporation, Wayne, Pa.

Filed Dec. 3, 1975, Ser. No. 637,266
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 ED **10 Claims**



1. In a pattern recognition system including scanning means for generating signals representative of a pattern scanned by said scanning means, means for examining the signals from said scanning means for generating parameters of the pattern scanned, pattern recognition means responsive to said parameters for identifying the pattern scanned and an operator keyboard for entering data relating to patterns scanned, an interface between said means for examining and said pattern recognition means, said interface including first temporary storage means for receiving parameters relating to a pattern being scanned and second temporary storage means for receiving data from said keyboard and buffer storage means for concurrent entry of both said parameters and said data into said pattern recognition means to enable said pattern recognition means to adapt to recognize said pattern and like patterns in accordance with both said parameters and said data.

4,048,617

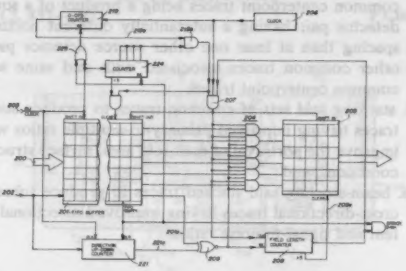
RETRACE DATA ELIMINATION

Marion W. Neff, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed July 3, 1975, Ser. No. 593,118
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 SY **9 Claims**

1. A system for modifying a set of data signals in a hand scan character recognition system where each data signal representative of a character has an associated scan direction signal generated as a data field, which includes a plurality of data field characters, is scanned comprising:

a. storage means to receive said data signals,



b. means responsive to said direction signals to establish a majority direction signal corresponding to the direction for which the greatest number of data signals have been generated, and

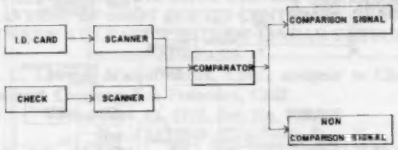
c. means operable to utilize only those data signals from said storage means for which the direction signal is the same sense as the sense of said majority direction signal.

4,048,618

METHOD OF IDENTIFYING A CHECK SIGNER

Seth T. Hendry, Twin Falls, Idaho, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 24, 1976, Ser. No. 744,722
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 E **1 Claim**



1. A method of identifying a check signer, comprising the steps of

applying a fingerprint of a person to an identification card in invisible ink;

applying the same fingerprint of the person to a check in invisible ink in the presence of a person requested to cash the check;

scanning the fingerprint of the identification card to provide a first set of electrical signals;

scanning the fingerprint of the check to provide a second set of electrical signals;

comparing the first and second sets of electrical signals; and

indicating comparison or non-comparison of the first and second sets of electrical signals to indicate the authenticity of the signer.

4,048,619

SECURE TWO CHANNEL SCA BROADCASTING SYSTEM

Aubry S. Forman, Jr., Toledo, Ohio; Charles A. Schultz, Jr., and William E. Vice, both of Gainsville, Fla., assignors to Digital Data Inc., Toledo, Ohio

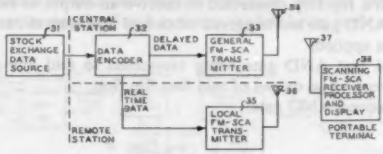
Filed Sept. 7, 1976, Ser. No. 721,316
Int. Cl.² H04B 7/26; H04H 1/08; H04J 1/14; H04Q 9/00
U.S. Cl. 340—154 **11 Claims**

1. A secure two channel information broadcasting system comprising:

a central broadcasting station for encoding and transmitting, as an SCA component of a FM carrier signal having a first frequency, data received from an information source;

a remote broadcasting station for transmitting, as an SCA component of a FM carrier signal having a second frequency, said encoded data received from said central broadcasting station; and

a terminal for receiving, decoding and displaying said encoded data including means for receiving FM carrier signals in a frequency band including said first and second frequency carrier signals, means for alternately generating first and second reference signals each having a frequency which differs by a predetermined frequency from the frequencies of said first and and second frequency carrier



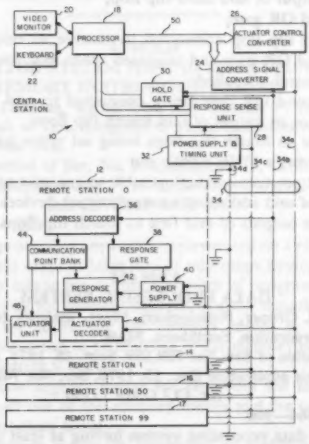
signals respectively, means responsive to said receiving means and to said reference signal generating means for combining said first frequency carrier signal with said first reference signal and for combining said second frequency carrier signal with said second reference signal to generate a difference signal having said predetermined frequency, means responsive to said difference signal for detecting said SCA components and for directing said reference signal generator means to continue to generate the one of said reference signals associated with the one of said carrier signals having its SCA component first detected whereby said receiving means locks on said one carrier signal, and means for decoding and displaying said encoded data from said SCA components of said carrier signals.

4,048,620

CENTRAL STATION TO ADDRESSED POINT COMMUNICATION SYSTEM

Richard E. Crandall, and Denny E. Morgan, both of Cambridge, Mass., assignors to Kinney Safety Systems, Inc., New York, N.Y.

Filed Oct. 2, 1974, Ser. No. 511,109
Int. Cl.² H04Q 9/00
U.S. Cl. 340—163 **18 Claims**



1. A multiple point communication system having a central station, a plurality of communication points organized into groups, each group being associated with a different remote station, and wherein communication can take place between the central station and each communication point, said system comprising:

A. address signal generating means at said central station for producing address signals including at least first signals identifying the remote station to be addressed and second signals identifying the communication point of the group within the remote station which is addressed, said generating means including means for producing said address signals using a total of at least three different values in frequency and/or voltage to identify the remote station address information and communication point address information,

said address signals comprising a plurality of pulses, each pulse being an independent information carrier and being identifiable with a portion of said address signals, said pulses being generated serially,

B. address responsive means associated with each remote station, each said address responsive means

1. applying power to an associated response generating means in response to said first address signals identifying the associated remote station, and

2. coupling to said powered response generating means, in response to said second address signals, the associated communication point identified with said second address signals,

C. signal transmission means for communicating said address signals from said central station to each remote station over a common transmission path and for communicating from said remote stations a report signal to the central station,

D. response generating means associated with each remote station, each said response generating means being normally unpowered and when powered, producing an analog valued report signal, responsive to an electrical parameter present at an associated point coupled therewith, and

E. sensing means at said central station for receiving over said transmission means the output of said response generating means and for producing an output manifestation in response to said report signal.

4,048,621

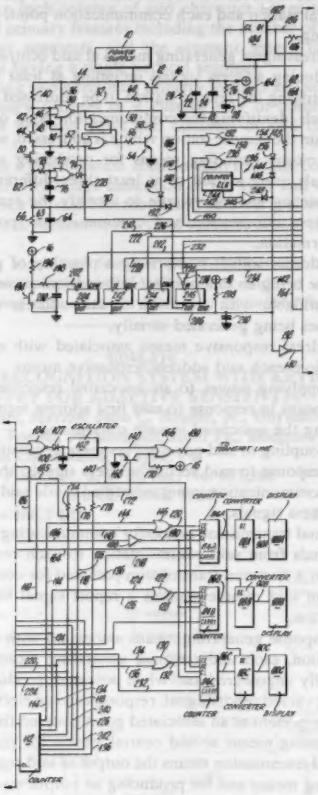
CODING SYSTEM FOR AN ALARM SYSTEM AND THE LIKE

Robert M. Conklin, Chappaqua, N.Y., and Arthur T. Human, Norwalk, Conn., assignors to Holmes Protection Inc., New York, N.Y.

Filed Mar. 17, 1976, Ser. No. 667,786
Int. Cl.² H04Q 9/00; H03K 21/12
U.S. Cl. 340—168 B **16 Claims**

1. A system for registering and transmitting a preselected code to a receiving station comprising switch means operable between open and closed states; an oscillator responsive to the operation of said switch means to the closed state for producing a pulse train; an advance signal generator for generating an advance signal in response to an energizing signal; control means having a plurality of states and being movable from state to state in response to said advance signal; counting means connected to said oscillator for registering the number of pulses in response to one state of said controlled means; transmitting means responsive to another state of said control means for connecting said oscillator to a transmission line; said counting means comprising energizing signal generating means for

applying an energizing signal to said advance signal generator to change the state of said control means when the number of



pulses transmitted by said transmitting means is equal to the count registered in said counting means.

4,048,622

PROGRAMMABLE SEQUENCE CONTROLLER

Toshihiko Yomogida, Kariya, Japan, assignor to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed Aug. 11, 1976, Ser. No. 713,351

Claims priority, application Japan, Sept. 11, 1975, 50-110666

Int. Cl.[2] G05B *11/32*

U.S. Cl. 364—900 **7 Claims**

1. A programmable sequence controller comprising:

memory means for memorizing a sequence program comprising a train of instructions identified respectively by memory addresses thereof, each of said instructions having command information and address information therein, said command information being selected from a group of control commands including a first control command for examining whether an input is in an ON state under the condition of being ANDed with another input, a second control command for examining whether an input is in an OFF state under the condition of being ANDed with another input, a third control command for examining whether an input is in an ON state under the condition of being ORed with another input, and a fourth control command for examining whether an input is in an OFF state under the condition of being ORed with another input,

an input circuit operatively connected to a plurality of addressed external input devices for converting states of said external input devices into logical values;

an output circuit operatively connected to a plurality of addressed external output devices to be energized or deenergized;

a logic operation circuit operatively connected to said memory means and to said input and output circuits;

means for reading out and feeding said train of instructions from said memory means to said logic operation circuit;

said logic operation circuit comprising:

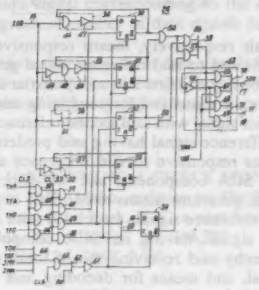
a line connected to receive a logical value of one of said external input devices specified by the address information;

a first AND gate;

a first flip flop connected to receive an output of said first AND gate and triggered when said first control command is applied;

said first AND gate being connected to said line and to receive an output of said first flip flop;

a second AND gate;



a second flip flop connected to receive an output of said second AND gate and triggered when said second control command is applied;

said second AND gate being connected to said line and to receive an output of said second flip flop;

a first OR gate;

a third flip flop connected to receive an output of said first OR gate and triggered when said third control command is applied;

said first OR gate being connected to said line and to receive an output of said third flip flop;

a second OR gate;

a fourth flip flop connected to receive an output of said second OR gate and triggered when said fourth control command is applied;

said second OR gate being connected to said line and to receive an output of said fourth flip flop;

said first to fourth flip flops being set when triggered and receiving a ONE signal; and

said output circuit being operable to energize or deenergize one of said addressed external output devices in response to the outputs of said first to fourth flip flops.

4,048,623

DATA PROCESSING SYSTEM

Ronald H. Gruner, Framingham, Mass., assignor to Data General Corporation, Southboro, Mass.

Continuation of Ser. No. 509,159, Sept. 25, 1974, abandoned.

This application Dec. 13, 1976, Ser. No. 749,911

Int. Cl.[2] G06F *13/00*

U.S. Cl. 364—900 **12 Claims**

2. In a data processing system having at least one data accessing control unit, a memory unit comprising a plurality of memory modules interconnected by module interconnecting

means, said modules being capable of synchronous or non-synchronous operation;

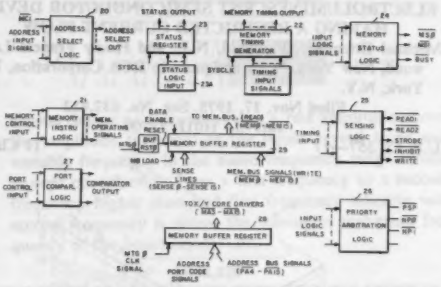
means for sequentially transferring addresses from said at least one data accessing control unit to the memory modules of said memory unit;

means for sequentially transferring data between said at least one data accessing control unit and the memory modules of said memory unit;

each module including

timing means for initiating the operating time cycle of said each memory module in response to an address transferred thereto from a data accessing control unit;

memory control means including means for generating a data transfer status signal to indicate the data transfer status of said each memory module, the data transfer status signals of each memory module being made available by said module interconnecting means to all of said memory modules; and



means responsive to a said timing means and to data transfer status signal from another of said memory modules which had been previously started for preventing a transfer of data with respect to said each memory module before data has been completely transferred with respect to said another previously started memory module and including means for permitting a transfer of data with respect to said each memory module when the transfer of data with respect to said another previously started memory module has been completed;

said timing means further including means permitting the operating time cycle of said each memory module to be started before the transfer of data between said another previously started memory module has been completed.

4,048,624

CALCULATOR SYSTEM HAVING MULTI-FUNCTION MEMORY INSTRUCTION REGISTER

Michael J. Cochran, Richardson, and Charles P. Grant, Jr., Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 396,903, Sept. 13, 1973. This application July 7, 1975, Ser. No. 593,611

Int. Cl.[2] G06F *1/00, 9/00*

U.S. Cl. 364—200 **4 Claims**

1. In data processing apparatus implemented on a plurality of semiconductor chips at least two of said chips having:

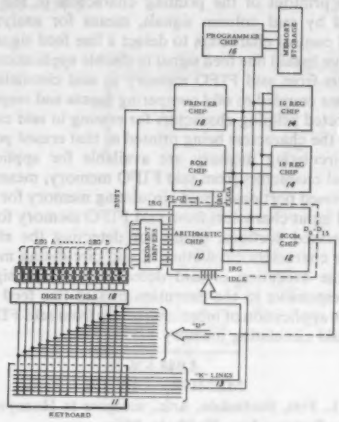
a. memory means for storing a number of program instructions words for defining operation of the apparatus,

b. means for addressing the memory means to cause an instruction word to be read out of the memory means and for outputting a code,

c. instruction register means for receiving the instruction word read out of the memory means and for outputting said instruction word,

d. chip selection means for generating an enabling signal in response to said code being of a preselected setting, said enabling signal being generated by the chip selection means on only one of said at least two chips at a given time,

e. output means connected to said instruction register means for receiving the instruction word outputted therefrom and for entering said instruction word back into said instruction register means in response to said enabling signal, and



f. decoder means for decoding the instruction word entered into said instruction register means from said output means,

the at least two of said chips being interconnected by the output means thereof to receive the instruction word read out of the memory means on the one of said at least two chips for decoding by the decoder means on the other of said at least two chips.

4,048,625

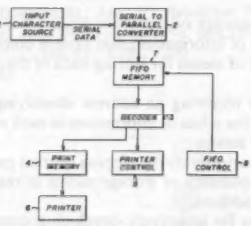
BUFFERED PRINT CONTROL SYSTEM USING FIFO MEMORY

Samuel C. Harris, Jr., and William A. Surber, both of Waynesboro, Va., assignors to General Electric Company, Waynesboro, Va.

Filed May 5, 1976, Ser. No. 683,417

Int. Cl.[2] G06F *3/12;* **G11C** *9/00*

U.S. Cl. 364—900 **12 Claims**



1. In a printer having a plurality of printing characters and means for effectively moving said printing characters during printing such that they appear as a sequence of individually different printing characters moving from column to column along a print line, means for receiving input characters at a first rate, said input characters comprising printable and control characters, a FIFO memory for serially storing said received input characters in the order in which they are received, means coupled to said FIFO memory comprising a circulating memory having a character capacity greater than one character but no greater than a full print line of characters, means responsive to printable received characters for producing column signals representing the columns at which said printable input characters are to be printed, means for applying said column signals

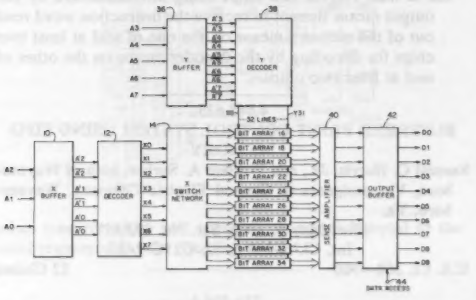
and said received printable characters to said circulating memory for storage to provide stored signals and for circulating said stored signals in synchronism, means for providing position signals identifying each column change in moving printing character positions, means for comparing said stored signals and said position signals to detect printing characters to be printed, means responsive to said detected printing characters to cause printout of the printing characters in the columns indicated by said column signals, means for analyzing said received control characters to detect a line feed signal, means responsive to said line feed signal to disable application of input characters from said FIFO memory to said circulating memory, means coupled to said comparing means and responsive to said detected printing characters for erasing in said circulating memory the characters being printed so that erased portions of said recirculating memory are available for application of additional characters from said FIFO memory, means responsive to erased portions in said circulating memory for applying received input characters from said FIFO memory for storage in said erased portions, means for detecting the absence of printable characters circulating in said circulating memory to enable the execution of said detected line feed signal, and means responsive to the execution of said line feed signal to re-enable application of input characters from said FIFO memory to said circulating memory.

4,048,626

MEMORY DEVICE

Darrell L. Fett, Scottsdale, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 29, 1975, Ser. No. 644,658
Int. Cl.[2] G11C *11/40*
U.S. Cl. 340—173 R **23 Claims**



1. A data storage system for accessing stored words consisting of n-bits of information, said system comprising:

a plurality of means for storing each of the n-bits of information;

means for receiving an address identifying the location of each of the n-bits of information in each of said plurality of storage means;

means for selectively developing current paths through each of said plurality of storage means in response to said received address;

said means for selectively developing current paths further comprising:

means for applying a first electrical potential upstream of the particular addressed storage location within said storage means;

means for applying a second electrical potential downstream of the particular addressed storage location within said storage means, said second electrical potential being lower than said first electrical potential so as to establish a current path through said particular addressed location;

said means for applying a first electrical potential upstream of the particular addressed storage location still further comprising:

a plurality of means for providing current from said first electrical potential to each of said storage means;

said plurality of means for providing current from said first electrical potential to each of said storage means comprising:

a plurality of conductive lines, each being conductively connected to said storage means;

means for sensing each of said plurality of storage means to ascertain the conductive status of the selectively developed current path therein; each of said storage means comprising:

a plurality of multi-emitter transistors each with a base being connected to one of said plurality of conductive lines; each of said storage means further comprising:

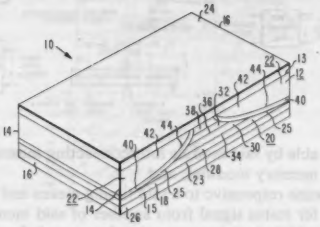
a plurality of emitter lines each of which is conductively closed with respect to at least one of the emitters of said multi-emitter transistors.

4,048,627

ELECTROLUMINESCENT SEMICONDUCTOR DEVICE HAVING A RESTRICTED CURRENT FLOW

Michael Ettenberg, Freehold, N.J., and Harry Francis Lockwood, New York, N.Y., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,812
Int. Cl.[2] H01L *33/00*
U.S. Cl. 357—17 **11 Claims**



1. An electroluminescent semiconductor device having restricted current flow comprising:

a body of semiconductor material having opposed end surfaces, opposed side surfaces extending to said end surfaces, opposed first and second contact surfaces substantially perpendicular to said end surfaces and said side surfaces;

said body having therein a substrate at said second contact surface having a surface opposite said second contact surface, an active region at least a portion of which is capable of generating electroluminescence, all of said active region being in the form of a mesa, said active region is on a portion of said opposite surface of said substrate and extends to said first contact surface, said active region having side surfaces which are spaced from said side surfaces of said body, and passive regions which extend from the side surfaces of said active region to said side surfaces of said body and said first contact surface, said passive regions having therein a P-N junction extending from said first contact surface to said side surface of said body.

4,048,628

METHOD AND APPARATUS FOR ERASING SCATTERING IN STORAGE-TYPE LIQUID CRYSTALS BY FREQUENCY SWEEPING

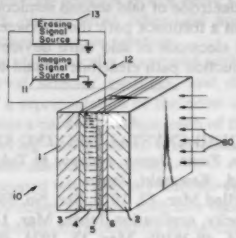
Donald D. Boswell, Granada Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 28, 1976, Ser. No. 709,360
Int. Cl.[2] G02F *1/00*; G11C *11/42, 7/00*
U.S. Cl. 340—173 LM **9 Claims**

6. The method for causing transformation from the scattered to non-scattered state in a storage-type liquid crystal cell having a storage-type liquid crystal layer said method comprising the steps of:

a. applying a precursor signal having an amplitude above the amplitude threshold of the liquid crystal cell at a frequency below the frequency maximum scattering, and

b. secondly, applying an erasing signal across the liquid



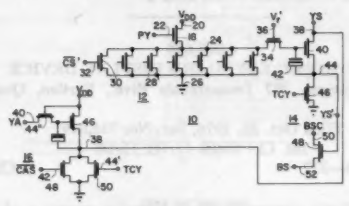
crystal device said signal having a rms amplitude above the amplitude threshold of the liquid crystal layer and variable frequency in the audio frequency range which sweeps continuously from a first frequency to a second frequency higher than said first frequency wherein said second frequency is above the maximum scattering frequency of the liquid crystal cell.

4,048,629

LOW POWER MOS RAM ADDRESS DECODE CIRCUIT

Alan Richard Bormann, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 2, 1975, Ser. No. 609,854
Int. Cl.² H03K *19/34*; G11C *11/34*
U.S. Cl. 340—173 CA **2 Claims**



1. In a MOS semiconductor random access memory chip including a plurality of address inputs, a chip selection input, and a plurality of sense lines, an address decode circuit coupled between first and second voltage conductors comprising:

a dynamic NOR gate responsive to said plurality of address inputs having an output and including a first MOSFET means coupled between said output and said first voltage conductor for precharging said output, and a plurality of input MOSFETs responsive to said address inputs coupled between said output and said second voltage conductor for discharging said output if said dynamic NOR gate is not selected by said plurality of address inputs;

sense line selection circuit means coupled to said output for effecting selection of one of said sense lines in response to said dynamic NOR gate on the condition that said dynamic NOR gate is selected;

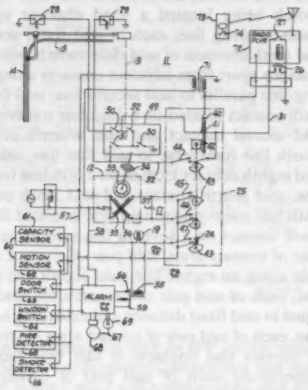
MOSFET means responsive to said chip selection input coupled between said output and said second voltage conductor for discharging said output on the condition that said MOS semiconductor random access memory chip is unselected to avoid selection of said one of said sense lines.

4,048,630

DOOR OPERATOR WITH AUTOMATIC CONTROL OF AUXILIARY CIRCUIT

Andrew F. Deming, Alliance, and Alvin J. Carli, Sebring, both of Ohio, assignors to The Alliance Manufacturing Co., Inc., Alliance, Ohio

Filed Jan. 22, 1976, Ser. No. 651,536
Int. Cl.² G08B *13/08*
U.S. Cl. 340—274 R **20 Claims**



1. A door operator having a motor connected to open and close a door, comprising, in combination,

a motor energization circuit,

a lamp,

a lamp energization circuit connected to said lamp,

plural switches connected to control said motor and lamp energization circuits,

an alarm circuit,

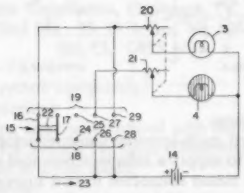
and enabling means connecting said alarm circuit to one of said energization circuits so that actuation of one of said switches closes the door and establishes de-energization of said one of said energization circuits and enables said alarm circuit.

4,048,631

PORTABLE VARIABLE INTENSITY SIGNALLING FLASHLIGHT

Jose Flores, 50 Division St., Apt. 7C, Brooklyn, N.Y. 11211

Filed Jan. 15, 1976, Ser. No. 649,259
Int. Cl.² F21L *7/00*
U.S. Cl. 340—321 **1 Claim**



1. A portable variable intensity signalling flashlight comprising a first incandescent lamp, said first incandescent lamp having a first and second electrical terminal, a first variable resistor, said first variable resistor having a first and second terminal, said first terminal of said first incandescent lamp electrically connected to said first terminal of said first variable resistor, a second incandescent lamp, said second incandescent lamp having a first and second terminal, said first terminal a second variable resistor, said second variable resistor having a

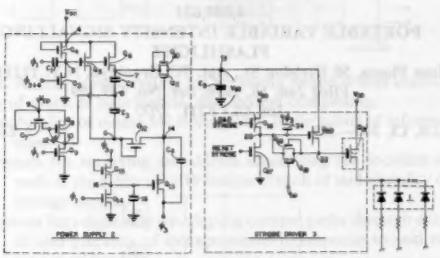
first and second terminal of said second incandescent lamp connected to said first terminal of said second variable resistor, means for manually adjusting the resistance of said first and said second resistors a battery, said battery having a first and second terminal, said second terminal of said first incandescent lamp connected to said second terminal of said second incandescent lamp and to said first terminal of said battery, a slide switch, said slide switch having a first, second, third, fourth, fifth, sixth, seventh, eighth, ninth and tenth contact, each of said first, second, third, fourth and fifth contacts of said slide switch being located a fixed distance apart from adjacent contacts along line, each of said sixth, seventh, eighth, ninth and tenth contacts of said slide switch being located said fixed distance apart from adjacent contacts along a second line, said first line parallel to said second line, said first contact and said sixth contact located on a third line transverse to said first line, said second contact and said seventh contact located on a fourth line transverse to said first line, said third contact and said eighth contact located on a fifth line transverse to said first line, said fourth contact and said ninth contact located on a sixth line transverse to said first line, said fifth contact and said tenth contact on a seventh line transverse to said first line, a pair of contact arms, said pair of contact arms manually slidable along an eighth line, said eighth line parallel to said first line, each of said pair of contact arms spaced apart a distance equal to said fixed distance and extending normal to said eighth line, each of said pair of contact arms having a length sufficient to contact said contacts of said first and said second lines, respectively each of said pair of contact arms electrically insulated from one another, said second terminal of said battery electrically connected to said sixth and said ninth and said tenth contacts, said second terminal of said first variable resistor electrically connected to said first and said fifth contacts, said second terminal of said second variable resistor electrically connected to said fourth contact.

4,048,632

DRIVE CIRCUIT FOR A DISPLAY

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 5, 1976, Ser. No. 664,222
Int. Cl.² H01L *27/15*
U.S. Cl. 340—324 R **14 Claims**



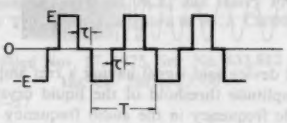
1. In combination:
at least one first multi-terminal semiconductor device,
source means to supply a reference potential signal,
power supply means connected to said source for boosting said reference potential signal, and
driver means connected between said power supply means and said at least one semiconductor device and adapted to selectively apply said boosted signal to a control electrode of said first semiconductor device to thereby drive said device,
said driver means including second and third multiterminal semiconductor devices,
the conduction path of said second semiconductor device selectively connected between said power supply means and the control electrode of said at least one first semiconductor device,
the conduction path of said third semiconductor device connected between one conduction path electrode and the control electrode of said second semiconductor device so as to form a feedback path therebetween, and
the control electrode of said third device connected to the one conduction path electrode of said second device.

4,048,633

LIQUID CRYSTAL DRIVING SYSTEM

Shunichi Sano, Zama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Mar. 12, 1975, Ser. No. 557,883
Claims priority, application Japan, Mar. 13, 1974, 49-28104; Mar. 13, 1974, 49-28105; Mar. 13, 1974, 49-28106; Mar. 13, 1974, 49-28107; June 19, 1974, 49-69113
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 M **6 Claims**



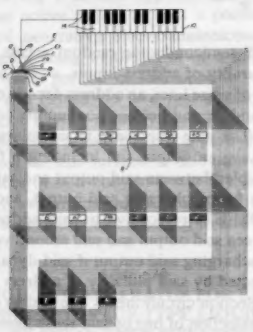
1. A liquid crystal device comprising a liquid crystal cell having at least one first and at least one second electrode disposed therein in a manner spaced from each other and a liquid crystal provided between said first and second electrodes, and means connected across said electrodes for generating a voltage pulse with a composite square wave comprising a train of square wave pulses, the train having a third harmonic wave component and in which the absolute value of the ratio $b3/b1$ where $b3$ represents the amplitude of the third harmonic wave component and b1 represents the amplitude of the fundamental wave component is less than $\frac{1}{3}$.

4,048,634

ELECTRONIC KEYBOARD DISPLAY DEVICE

Daniel Laflamme, 157 Desmarchais Blvd., Verdun, Quebec, Canada

Filed Oct. 26, 1976, Ser. No. 735,819
Int. Cl.² G09B *13/00, 15/08*
U.S. Cl. 340—337 **5 Claims**



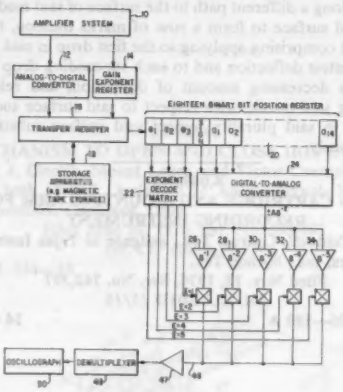
1. An electronic device for visually illustrating the note of a keyboard instrument represented by any musical interval in any musical key comprising:
1. a series of manually operable on-off key selector switches, one key selector switch associated with each desired key and each said key selector switch being exclusively and not simultaneously operable in the on position;

2. a series of manually operable on-off musical interval selector switches, one interval selector switch being associated with the value of each desired musical interval and each of said musical interval selector switch being simultaneously operable with one or more other said musical interval selector switches in the on position;
3. display means electronically associated with said key and musical interval selector switches, said display means consisting of a representation of the notes of a keyboard instrument over a particular range, each of the note representations having independent electronically actuated indicator means associated with it;
4. circuitry associated with said key selector switches, interval selector switches and note indicator means to actuate the indicator means corresponding to the note represented in a selected key by a musical interval of selected value.

4,048,635
SEISMIC PLAYBACK/MONITOR SYSTEM

John R. Bich, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 597,050
Int. Cl.² H03K *13/03*
U.S. Cl. 346—347 DA **6 Claims**

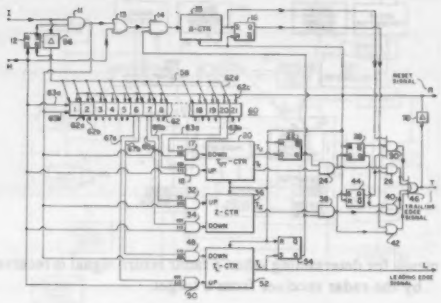


1. In a system wherein a wide dynamic amplitude range analog signal is digitized in floating point word form, said word being represented in digital signal form by the general algebraic form $Q = \pm AB^{-E}$ wherein Q represents the amplitude of the analog signal, A represents the mantissa, B indicates the radix of the number system used, E represents the exponent, and wherein said word is represented by a first plurality of binary bits representing ± A and a second plurality of binary bits representing E, a system for recreating an analog signal from the floating point words comprising: first means for converting said bits representing A to an analog signal; second means for converting said bits representing E to a plurality of control signals, each control signal representing a particular value of E; a plurality of attenuator means, each attenuator means being coupled to said first converting means for attenuating said analog signal from the first converting means by a different amount to provide an output signal; a plurality of switch means, each switch means being connected to a different attenuator means and receiving a different control signal and controlled by the second converting means to pass or block to an output signal from the attenuator; and amplifier means coupled to all said switch means for providing the recreated analog signal in accordance with an output signal passed by one of the switch means.

4,048,636
SECONDARY RADAR/IFF ANTI-TARGET SPLITTING AZIMUTH DETERMINER

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,228
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.5 LC **3 Claims**



1. A device for use in conjunction with an IFF system which on the basis of replies to interrogations determines and indicates the IFF target leading edge and trailing edge, said IFF system having receiving means for receiving replies to interrogations and for indicating when a reply is correct, said device comprising:

counting means connected to said IFF system for counting the number of interrogations made by the IFF system;

means, connected to said receiving means and to said counting means, for producing a leading-edge signal when a predetermined number T_L of correct replies are received in any consecutive sequence of W_L responses;

means, connected to said receiving means and to said counting means, for producing a trailing-edge signal upon the occurrence of a number T_Z of non-correct replies in a group of W_2 replies and either at least a number B of successive interrogations have been transmitted after a leading-edge signal has been produced, or a number T_u of correct replies is found to exist in a group of W_u received replies followed by reduction of said number T_u to a smaller number T_r.

4,048,637
RADAR SYSTEM FOR DETECTING SLOWLY MOVING TARGETS

Omar J. Jacomini, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 23, 1976, Ser. No. 669,550
Int. Cl.² G01S *9/42*
U.S. Cl. 343—7.7 **14 Claims**

1. A radar system comprising:

a radar transmitter;

a transmitting antenna associated with the transmitter;

first means for moving the radar transmitting antenna along a first path at a first speed;

a radar receiver;

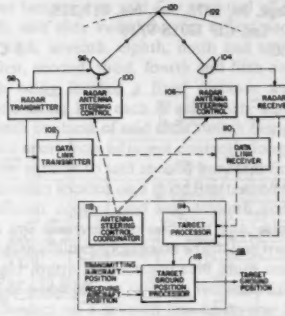
a receiving antenna associated with the receiver;

second means for moving the radar receiving antenna along a second path at a second speed, said transmitting antenna and said receiving antenna being physically remote from each other;

means for coordinating the scanning of the radar transmitter and receiver antennas;

said first and second paths having suitable directions and said first and second speeds being of suitable values such that the rate of change of the angle between the first path and

a line from the radar transmitter antenna to a target area is substantially equal and opposite to the rate of change of the angle between the second path and a line from the radar receiver antenna to said target area; and



means for determining when a radar return signal is received by the radar receiver from a target.

4,048,638

ANTENNA LENGTH INDICATOR

Joseph B. Cejka, Fair Haven, N.J., assignor to Ward Products Corporation, New Brunswick, N.J.

Filed Dec. 15, 1975, Ser. No. 641,034
Int. Cl.² H01Q *1/10*
U.S. Cl. 343—894 **5 Claims**

1. In a telescoping antenna having at least one moveable telescoping antenna section which telescopes in and out of an adjacent antenna section for substantially the entire length thereof, the improvement which comprises an indicator on said moveable antenna section which indicates the degree of telescopic movement of said moveable antenna section which is necessary to achieve a predetermined overall extended antenna length,

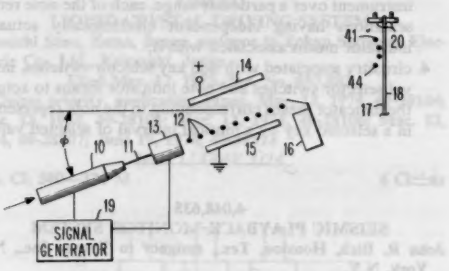
wherein said indicator comprises a sleeve around said moveable antenna section which is freely slidable between the upper end of said moveable antenna section and a sleeve stop provided by an enlargement on said moveable antenna section below said upper end whereby when said sleeve is positioned at said stop and said moveable antenna section is telescoped into said adjacent antenna section so that said sleeve is immediately adjacent the upper end of said adjacent antenna section, said predetermined overall extended antenna length will be achieved.

4,048,639

INK JET NOZZLE WITH TILTED ARRANGEMENT

James Calvin Walsh; Joseph Townsend Wilson, III, both of Endicott, and Bruce Allen Wolfe, Johnson City, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,769
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 **5 Claims**



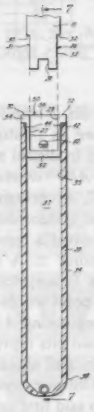
1. In the method of operating a printer by issuing from a nozzle toward a relatively moving recording medium a stream of drops of marking liquid, and deflecting the drops in a plurality, each along a different path to the surface of said medium to impact said surface to form a row of marks thereon, the improvement comprising applying to the first drop in said plurality the greatest deflection and to each succeeding drop in said plurality a decreasing amount of deflection, and relatively positioning said nozzle with respect to said surface such that the drops in said plurality impact said surface substantially simultaneously.

4,048,640

INK PEN CARTRIDGE AND MOUNTING ARM FOR A RECORDING INSTRUMENT

Bruce J. Caldwell, Conroe, Tex., assignor to Tejas Instrument Engineers, Inc., Spring, Tex.

Filed Nov. 15, 1976, Ser. No. 742,397
Int. Cl.² G01D *15/16*
U.S. Cl. 346—140 A **14 Claims**



1. An ink pen cartridge and mounting arm for a recorder comprising,

an ink cartridge including,

a hollow body for holding ink,

a nib adjacent one end of the body,

an opening in the side of the body adjacent to but spaced from the second end of the body,

a cap insertable into the second end and into the interior of the cartridge body, said cap including a first end shaped

and coacting with the interior of the body to normally seal against the inside of the body for holding ink in the body,

a post extending outwardly from one side of the cap between the ends of the cap for extending into the body opening for locking the cap in the cartridge body,

said cap having a second end larger than the interior of the cartridge body for abutting the second end of the cartridge body when the cap is positioned in the body,

said cap having a longitudinal recess on the side from which the post extends for receiving one end of a mounting arm, said recess extending from the second end of the cap towards the first end of the cap,

the second end of the cap including an outwardly facing shoulder on each side of the recess for coacting with shoulders on a mounting arm, and a mounting arm including,

an elongate arm having first and second ends,

the first end shaped for attachment to a recorder,

said second end being generally rectangular in cross section and sized for insertion in the recess in the cap, said second end including a notch for engagement with the post, and

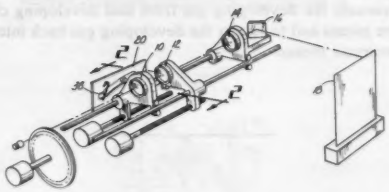
a stop shoulder on each edge spaced from the second end for coaction with the outwardly facing shoulders on the second end of the cap.

4,048,641

MECHANISM TO OPEN AND CLOSE IRIS ON LENS

Robert J. Cieplik, Mount Lakes, and Victor Czarnecki, Madison, both of N.J., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 14, 1976, Ser. No. 695,967
Int. Cl.² G03B *23/00*
U.S. Cl. 354—10 **3 Claims**



2. A cam and cam follower lens system, comprising:

a lens, an iris diaphragm that can be turned by a ring so as to change the diameter of a cnetral opening, said diaphragm and lens mounted on a carriage in juxtaposition whereby the diaphragm effectively controls the aperture of the lens;

way rods defining a carriage track and means mounting said carriage for longitudinal movement on said track;

said iris diaphragm ring having a drive receiving gear configuration, an idler gear engaged with said diaphragm gear;

a follower arm having a first end which is a gear segment and a second end which is a cam follower wheel, a means for pivotally mounting said arm with the gear segment engaged with said idler gear;

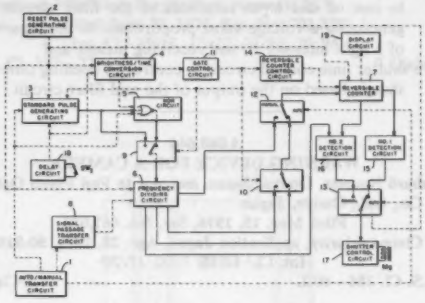
a cam plate extending parallel to said track, said plate having a guide slot which captures said wheel loosely held, said slot and wheel limited to a pressure angle of not more than 40°.

4,048,642

EXPOSURE TIME CONTROL DEVICE OF ELECTRIC SHUTTER FOR CAMERA

Takeo Saito, Yotsukaido, and Youichi Seki, Chiba, both of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Feb. 18, 1975, Ser. No. 550,591
Claims priority, application Japan, Feb. 18, 1974, 49-19271
Int. Cl.² G03B *7/08*
U.S. Cl. 354—23 D **1 Claim**



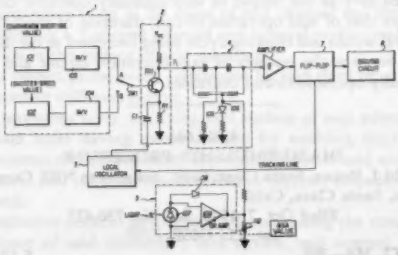
1. In an exposure time control circuit of the type including a reversible counter operable in an addition mode for counting a number of pulses representative of an exposure time, and in a subtraction mode for reading-out the counted pulses for controlling the exposure time; a pulse generator for generating standard pulses at a certain rate; a brightness/time conversion circuit responsive to the brightness of a scene to be photographed for developing a single pulse having a duration proportional to the exposure time; and means for applying standard pulses to said counting circuit to count standard pulses for the duration of the pulse proportional to the exposure time and for switching said counting circuit to the subtraction mode upon the completion of the pulse proportional to the exposure time; the improvement which comprises: said means for applying including control means responsive to the completion of the pulse proportional to the exposure time and responsive to a shutter opening trigger pulse for switching said counting circuit to the subtraction mode upon the occurrence of either, whereby the exposure time control circuit is operative for controlling exposure time if the shutter opening trigger pulse occurs before the pulse proportional to the exposure time is terminated.

4,048,643

EXPOSURE COMPUTATION SYSTEM

Isao Arita, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,379
Int. Cl.² G03B *7/08*
U.S. Cl. 354—51 **15 Claims**



1. An exposure computation system comprising:

converting means for transforming diaphragm information into a frequency value,

a mixer having two terminals, one of which is connected to said converting means,

a local oscillator for providing a sweep signal, and which is connected to the other terminal of said mixer,

a filter circuit having two input terminals, one of which is connected to said mixer, and whose center frequency is variable according to object luminance information,

an object luminance information receiving means connected to one of said input terminals of the filter circuit, for generating a voltage value proportional to the logarithm of a light intensity to said receiving means, and

a shutter time control circuit to control an opening time of a shutter based on the output of the said filter circuit.

4,048,644

WARNING DEVICE FOR A CAMERA

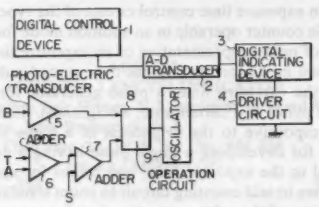
Saburō Numata, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Mar. 15, 1976, Ser. No. 667,073

Claims priority, application Japan, Apr. 28, 1975, 50-51837

Int. Cl.[2] G03B *7/00, 17/20*

U.S. Cl. 354—60 L **3 Claims**



1. Warning device for a camera having an operation circuit for determining proper exposure condition of exposure information such as the shutter time according to the informations of the brightness of the object, the diaphragm aperture of the objective and the film sensitivity, a manually operable circuit for manually setting the condition circuit, the improvement comprising a comparison circuit having a first input connected to the output of said operation circuit and having a second input connected to said manually operable circuit, and an oscillator with input connected to the output of said comparison circuit, the output of said oscillator being connected to said optical indicating circuit so as to cause blinking of the optical indication of said optical indicating circuit when the output of said operation circuit differs from the output of said manually operable circuit, said indicating being in a lighted state when the output of said operation circuit coincides with the output of said manually operable circuit, the duty ratio of pulses of said oscillator being varied depending upon the output of said comparison circuit so as to render the duty ratio to be increased to 1 as the output of said manually operable circuit reaches that of said operation circuit; duration of the lighted interval within one blinking cycle being increased as the difference between the outputs of said operation circuit and said manually operable circuit decreases.

4,048,645

DIAZO EMULSION PROCESSOR

Donald J. Reams, Santa Clara, Calif., assignor to NBK Corporation, Santa Clara, Calif.

Filed Oct. 7, 1976, Ser. No. 730,422

Int. Cl.[2] G03D *7/00*

U.S. Cl. 354—300 **5 Claims**

1. Apparatus for developing photographic images on diazo emulsion media comprising:

a developing chamber means for containing diazo coated media to be developed;

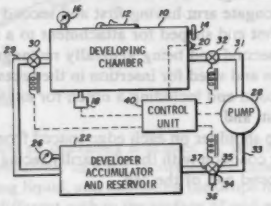
reservoir means for containing a developing gas;

pump means;

first conduit means for establishing a first fluid flow path between said reservoir means and said chamber means, said first path including a first valve means;

second conduit means for establishing a second fluid flow path between said chamber means and said pump means, said second path including a second valve means;

third conduit means for establishing a fluid flow path between said pump means, the atmosphere, and said reservoir means, said third path including a third valve means having a first position for passing fluid to the atmosphere and a second position for passing fluid to said reservoir means; and



control means including a plurality of programmable switching means for controlling said pump means and said first, second, and third valve means, said control means causing the apparatus to operate in an operative sequence, first to cause said second valve means to open and said third valve means to open to said first position and said pump means to draw a vacuum in said developing chamber means, second to cause said first valve means to open to allow developing gas to flow from said reservoir means into said developing chamber means, and third, after a predetermined period of time has elapsed, to cause said second valve means to open and said third valve means to open to said second position, and said pump means to evacuate the developing gas from said developing chamber means and to return the developing gas back into said reservoir means.

4,048,646

DUAL-GATE SCHOTTKY BARRIER GATE FET HAVING AN INTERMEDIATE ELECTRODE AND A METHOD OF MAKING SAME

Masaki Ogawa; Takashi Furutsuka, and Masaoki Ishikawa, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Feb. 25, 1976, Ser. No. 661,256

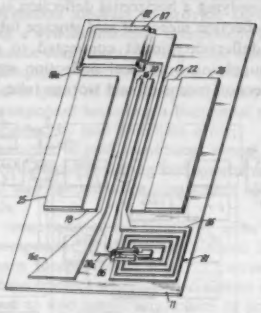
Claims priority, application Japan, Feb. 26, 1975, 50-23744

Int. Cl.[2] H01L *29/48, 29/80, 23/48*

U.S. Cl. 357—15 **13 Claims**

1. A dual-gate Schottky barrier gate field effect transistor including a substrate of a semiconductor having a planar surface, a pair of first metal film pieces for use as a first and a second gate electrode on said planar surface, and a pair of second metal film pieces for use as a source and a drain electrode on said planar surface on both sides of said pair of first metal film pieces, wherein the improvement comprises an intermediate metal film piece on said planar surface between said first metal film pieces with a space left between said inter-

mediate metal film piece and each of said first metal film pieces, said intermediate metal film piece being of a metal capable of



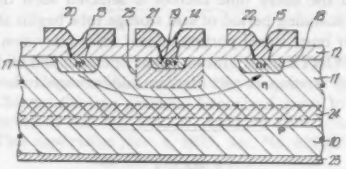
forming an ohmic contact with said semiconductor substrate at least at its portion contiguous to said planar surface.

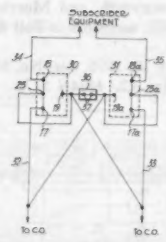
4,048,647

SOLID STATE DISCONNECT DEVICE

Kenneth Arnold Pickar, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sept. 10, 1976, Ser. No. 722,086
Int. Cl.² H01L *29/80*
U.S. Cl. 357—22 **6 Claims**





1. A solid state disconnect device for a telecommunication system including a Tip line and a Ring line, comprising: a pinch resistor element in each of said lines, each pinch resistor element including source, drain and gate areas, means connecting said lines to respective source and drain areas to connect said pinch resistor elements in said lines, an element in each line, each resistor element further including a substrate contact;

means for electrically connecting said substrate to said gate area of each resistor element, means for electrically connecting the gate area of each resistor element to the line in which is connected the other resistor element, and a termination device electrically connected between said gate areas of said elements;

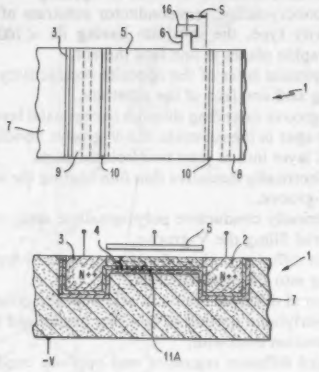
the arrangement such that application of a suitable voltage on one of said lines with respect to the other of said lines disconnects said other of said lines and connects said termination device.

4,048,648

HIGH CARRIER VELOCITY FET MAGNETIC SENSOR

Albert Watson Vinal, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,339
Int. Cl.² H01L *27/22, 29/82, 29/96*
U.S. Cl. 357—27 **9 Claims**



1. A magnetically sensitive field effect transistor structure, comprising:

a substrate of one conductivity type semiconductive material, said substrate having first, second, and third spaced apart contact diffusion regions of opposite conductivity type material to said substrate and defining, respectively, source, drain and output contact diffusion regions in a field effect device on the surface of said substrate;

said source and drain diffusions being separated from one another by a distance L;

a controllable conductance region forming a conduction channel of a field effect device located in the surface of said substrate and connecting said source and drain diffusions;

said channel having integral therewith a signal output probe of channel material itself comprising a lateral projection of said channel generally perpendicular to said length L, said projection lying in the plane of said channel and thereby defining a T-shaped channel and integral probe combination in the surface of said substrate;

said output probe being terminated by said third or output contact diffusion region;

an insulating layer overlying said surface of said substrate, said layer having means therein for enabling electrical contact to be made from above said layer to said source, drain and output contact diffusion regions, respectively; and,

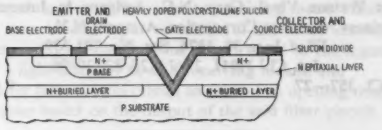
conductive control gate means for controlling the conductance of said channel in said device, said control gate means overlying said insulating layer in an area coextensive with said T-shaped channel and probe combination in the surface of said substrate.

4,048,649

SUPERINTEGRATED V-GROOVE ISOLATED BIPOLAR AND VMOS TRANSISTORS

Richard Bohn, Cleveland, Ohio, assignor to Transitron Electronic Corporation, Wakefield, Mass.

Filed Feb. 6, 1976, Ser. No. 655,638
Int. Cl.[2] H01L *27/04, 29/78, 29/72, 29/04*
U.S. Cl. 357—43 **3 Claims**



1. A semiconductor structure comprising

a monocrystalline semiconductor substrate of one conductivity type, the substrate having its <100> crystallographic planes at one face thereof,

an epitaxial layer of the opposite conductivity type overlying said one face of the substrate,

a V-groove extending through the epitaxial layer and having its apex in the substrate, the V-groove dividing the epitaxial layer into at least two isolated parts,

an electrically insulative thin film coating the surfaces of the V-groove,

electrically conductive polycrystalline semi-conductor material filling the V-groove,

a first diffusion region of said one conductivity type extending into the epitaxial layer,

a second diffusion region of said opposite conductivity type overlying a portion of said first region and forming a p-n junction therewith,

a third diffusion region of said opposite conductivity type extending into the epitaxial layer, said third region being disposed on a part of said epitaxial layer that is isolated by the V-groove from the part of the epitaxial layer on which said first and second regions are situated,

means on the surface of the semiconductor structure providing electrical connections to each of said diffusion regions and to the polycrystalline material in the V-groove, and

means for biasing the polycrystalline semiconductor material in the V-groove in a polarity which induces a conductive channel under the V-groove that enables the flow of electric current between isolated parts of the epitaxial layer.

4,048,650

STILL COLOR TELEVISION SIGNAL RECORDING AND REPRODUCING APPARATUS

Yoshinori Tanaka, Yokohama; Hajime Shinoda, Tokyo, and Hisaaki Narahara, Musashino, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed June 3, 1976, Ser. No. 692,317
Claims priority, application Japan, June 12, 1975, 50-71204
Int. Cl.[2] H04N *9/16, 5/76*
U.S. Cl. 358—1 **5 Claims**

1. A still color television signal recording and reproducing apparatus comprising:

a. a color television signal source;

b. a storage tube having horizontal and vertical deflection means;

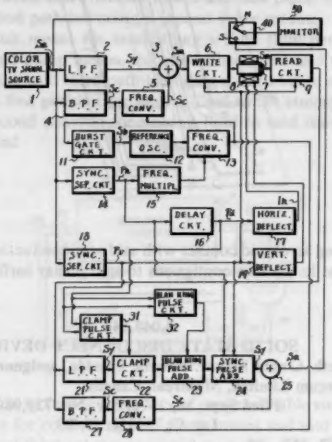
c. WRITE circuit means connected to said signal source for applying a field of a color television signal to said storage tube when operated;

d. READ circuit means connected to said storage tube for reading out a color video signal from the latter when operated;

e. a color picture reproducing means connected to said READ circuit means for receiving said read out color video signal and for reproducing a still color picture therein;

f. a horizontal deflection circuit connected to said signal source for supplying a horizontal deflection signal to the horizontal deflection means of said storage tube; and

g. a vertical deflection circuit connected to said signal source for supplying a vertical deflection signal to the vertical deflection means of said storage tube;



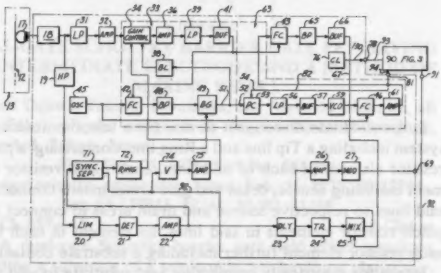
wherein said horizontal deflection circuit includes a delay circuit and the dalay time thereof is selected such that the horizontal scanning period of said storage tube begins at latest at the color burst signal portion of said color television signal from said WRITE circuit means when operated and said color burst signal portion is recorded in said storage tube at the beginning of every horizontal scanning period.

4,048,651

COLOR-CORRECTED VIDEO SIGNAL PROCESSING WITH AUGMENTED COLOR LOCK

James A. Miller, Chatsworth, and Morris L. Firkins, Lake Hughes, both of Calif., assignors to Bell & Howell Company, Chicago, Ill.

Filed July 10, 1975, Ser. No. 594,886
Int. Cl.[2] H04N *5/76*
U.S. Cl. 358—8 **5 Claims**



1. In combination: an information medium having physical characteristics representative of synchronized color video information:

an electric power supply providing alternating-current power subject to frequency fluctuations;

transport means coupled to the power supply for transporting the information medium at a variable relative speed

dependent upon the freqency fluctuations of the alternating-current power;

tranducer means disposed in proximity to the information medium and responsive to the physical characteristics of the information medium to provide an electrical signal including a synchronization component and including a chrominance component having color sidebands on a first carrier frequency and a time-base error dependent upon the variable speed of the transport means, said synchronization component including a horizontal synchronization signal affected by said time-base error;

means connected to said transducer means for amplifying said electric signal including said synchronization component and said chrominance component having said color sidebands;

means for compensating the time-base error of the chrominance component of the electric signal including color lock means for providing a direct current signal, automatic phase control means connected to said color lock means and to said amplifying means to provide with the aid of said direct current signal and said amplified electric signal an output signal having a frequency different from said first carrier frequency and being affected by said time-base error, and means connected to said amplifying means and to said automatic phase control means for relocating the amplified color sidebands about a stable second carrier frequency with the aid of said output signal of said automatic phase control means; and

means for augmenting the tolerance of said color lock means to effects of said frequency fluctuations including means for sensing a pulse rate change in said horizontal synchronization signal, means connected to said sensing means for providing a rate change signal corresponding to the sensed rate change, and means for augmenting said direct current signal with said rate change signal.

4,048,652

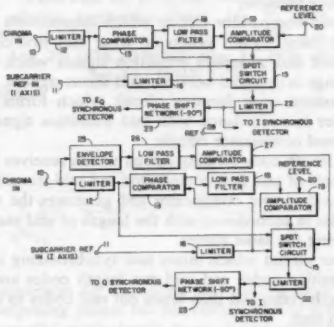
AUTOMATIC HUE CONTROL SYSTEM

Theodore S. Rzeszewski, Lombard, Ill., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 464,225, April 25, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,427

Int. Cl.[2] H04N *9/535*

U.S. Cl. 358—28 **26 Claims**



15. A method of providing hue control in a color television, including the steps of:

providing first signals at the frequency and phase of the chrominance signal;

providing second signals at a frequency and phase controlled by the reference subcarrier for the chrominance signal;

phase detecting said first and second signals to provide a control signal having an amplitude responsive to the phase differential between said first and second signals; and

combining said first and second signals to form a chrominance demodulating reference signal, the magnitude of said control signal being capable of controlling the magnitude of at least one of said first and second signals being combined so that said magnitude can have any value within a continuous operating range.

4,048,653

VISUAL DISPLAY APPARATUS

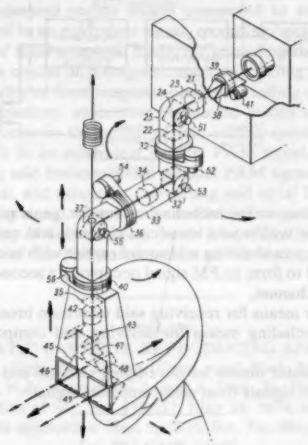
Archer Michael Spooner, South Nutfield, England, assignor to Redifon Limited, England

Filed Oct. 15, 1975, Ser. No. 622,717

Claims priority, application United Kingdom, Oct. 16, 1974, 44837/74

Int. Cl.[2] *7/18, 5/72*

U.S. Cl. 358—104 **8 Claims**



1. Visual display apparatus, for providing a visual display before a trainee pilot of a moving craft, or like observer, comprising image generating apparatus and image projection apparatus for projecting an image generated by the image generating apparatus, the projection apparatus including a projection screen of highly retroflective material at least partly surrounding the pilot, a helmet or the like, to be worn on the pilot's head, an optical projector for projecting the said image as a light beam and movable optical means defining a movable optical path for the said light beam between the optical projector and the pilot's helmet, light reflective means, carried by the said helmet, for reflecting said image light beam forwardly onto the said projection screen from a position corresponding to the pilot's eyes, means for varying said generated image in accordance with the movement and attitude of the said craft, means for sensing movement in rotation and in inclination of the said helmet and providing control signals corresponding thereto and means, responsive to said control signals, for varying said generated image correspondingly to the orientation of said pilot's helmet.

4,048,654

STEREOPHONIC TELEVISION SOUND TRANSMISSION SYSTEM

Carl R. Wegner, La Grange, Ill., assignor to Telesonics, Inc., Chicago, Ill.

Filed Feb. 18, 1976, Ser. No. 659,101

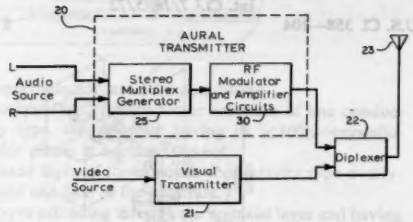
Int. Cl.[2] H04N *7/00*

U.S. Cl. 358—144 **59 Claims**

1. A stereophonic sound transmission system for transmitting within a television broadcast channel having defined frequency limits left and right audio source signals and a video source signal each having a predetermined upper frequency limit, said video source signal being amplitude-modulated on a

video carrier to form an AM signal occupying a first portion of said channel, said system comprising, in combination:

generator means including a stereo multiplex generator for generating a composite signal including a first component representative of the sum of said left and right source signals, a second amplitude-modulated subcarrier component representative of the difference between said left and right signals, said subcarrier component having upper and lower sidebands centered about a suppressed subcarrier, and a pilot component having a frequency one-half the frequency of said suppressed subcarrier;



transmitter means including means for generating a sound carrier within said broadcast channel, and means for frequency-modulating said sound carrier with said composite signal to form an FM signal occupying a second portion of said channel;

receiver means for receiving said television broadcast channel including means for deriving said composite signal; and

demodulator means for developing said left and right audio source signals from said composite signal.

4,048,655

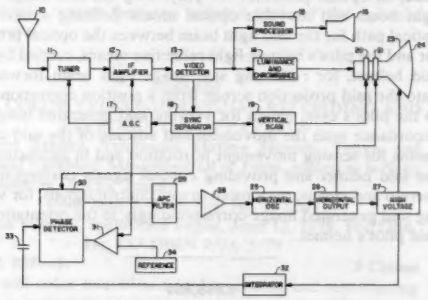
VARIABLE SPEED HORIZONTAL AUTOMATIC PHASE CONTROL

Judson A. Hofmann, Schaumburg, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 5, 1976, Ser. No. 646,721

Int. Cl.² H04N *5/04*

U.S. Cl. 358—148 **6 Claims**



1. In a television receiver including signal means recovering picture, audio and scansion synchronizing information from a received signal; display means; automatic gain control means maintaining the recovered picture information at a substantially constant level, horizontal and vertical scansion means developing a raster on said display means and horizontal scansion synchronization means synchronizing the horizontal scansion of said display with said synchronizing information, the improvement comprising:

control means producing analog variation of the system response speed of said horizontal scansion synchronization means directly with the amplitude of said received signal.

4,048,656

FACSIMILE DATA COMPRESSION METHOD

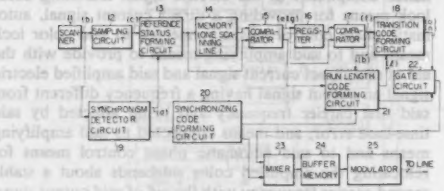
Atsushi Ishii; Kiyoshi Oikawa, and Tadaaki Suzuki, Kawasaki; Tetsuro Morita, Tokyo, and Yoshio Iizuka, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 18, 1975, Ser. No. 641,900

Claims priority, application Japan, Dec. 23, 1974, 50-2642

Int. Cl.² H04N *1/40, 7/12*

U.S. Cl. 358—261 **17 Claims**



1. A facsimile data compression apparatus comprising:

a scanner which scans the original figure with scanning lines;

a sampling circuit which samples the output signal of said scanner;

a synchronism detector which detects the synchronizing signal from the output of said scanner;

a reference status forming circuit which generates the reference status based on the output of said sampling circuit and said synchronizing signal;

a first comparator circuit which compares the upper picture elements lying in the *n*th scanning line and the lower picture elements lying there-beneath in the $n+1$th scanning line and generates status signals corresponding to a combination of said upper picture element and said lower picture element;

a second comparator circuit which successively compares said status signals generated from said first comparator circuit and generates transition signals when the status change is detected between said status signals;

a transition code forming circuit which forms transition codes in accordance with said transition signals of said second comparator circuit;

a run length code forming circuit which receives said status signals of said first comparator and said transition signals of said second comparator and generates the run length codes in accordance with the length of said status signals having the same status;

a mixer circuit which mixes said synchronizing codes, said transition codes and said run length codes and said run length codes and then sends out said codes to a transmission line;

a separator circuit which separates said synchronizing codes, said transition codes and said run length codes from the received signal via said transmission line;

a head mode forming circuit which receives said synchronizing code from said separator circuit and forms the head mode state;

a first decoder and a second decoder which decode said transition code and said run length codes received from said separator circuit;

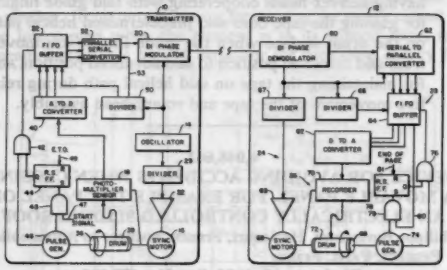
a group of gate circuits which receive the outputs of said head mode forming circuit and said first and second detectors so as to reproduce the information of said original figure.

4,048,657

METHOD AND APPARATUS FOR SYNCHRONIZING A FACSIMILE TRANSMISSION

Kurt E. Knuth, Mount Prospect, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Dec. 22, 1975, Ser. No. 642,854
Int. Cl.[2] H04N *1/04, 1/06, 1/36*
U.S. Cl. 358—285 6 Claims



3. An apparatus for receiving a diphase facsimile signal comprising:

a demodulator extracting both clock and data informational signals from the incoming diphase signal;

a positionable recorder for recording the said data signal upon a cppy sheet and a variable speed motor coupled to said recorder for positioning thereof, the speed of said motor being determined by the clock signal derived from the demodulator;

means for sequentially storing the data information from said demodulator;

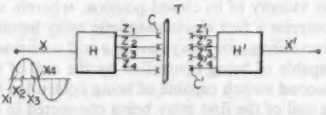
means for generating a signal related to the relative position of said recorder with respect to the copy sheet, the signal from said generating means serving to control the output rate of said storage means feeding said recorder.

4,048,658

VIDEO RECORDING AND REPRODUCING SYSTEM USING HADAMARD MATRIXING

Shiro Nakagawa, Tokyo, Japan, assignor to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Jan. 16, 1975, Ser. No. 541,663
Claims priority, application Japan, Jan. 22, 1974, 49-9834; Mar. 7, 1974, 49-25675; Apr. 17, 1974, 49-42257; Apr. 17, 1974, 49-43717; Aug. 21, 1974, 49-96301; Aug. 21, 1974, 49-96302
Int. Cl.[2] H04N *5/79*
U.S. Cl. 360—9 2 Claims



1. An apparatus for recording and playing back a video signal, comprising means for converting analog serial mode signals to parallel mode signals, means for sampling the amplitude of said parallel mode signals for every predetermined duration for converting said parallel mode signals to a PAM signal, Hadamard matrix means connected to convert said PAM signal to an equivalent signal, recording means having a plurality of fixed magnetic heads for recording the output of said matrix circuit on a magnetic medium, reading means having a plurality of fixed magnetic heads for reading data on said magnetic medium, an inverse Hadamard matrix circuit connected to convert the output of said second-mentioned magnetic heads to an equivalent parallel PAM signal, means for converting said last-mentioned parallel PAM signal to a serial PAM signal, and means for converting said serial PAM signal to an analog signal, wherein predetermined control signals are inserted in each of the parallel channels at the time of recording the signal, and the output circuit of each of the reproducing heads corresponding to the channels is provided with an electrically controllable variable delay circuit and connected to a phase discriminator circuit, whereby the output voltage signal from said phase discriminator circuit is fed to said electrically controllable variable delay circuit so as to eliminate any difference among control signals in different channels at the time of reproduction.

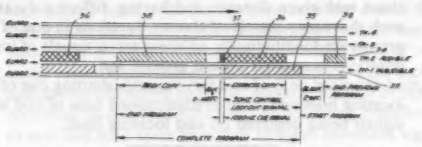
2. An apparatus for recording and playing back a video signal, comprising means for converting analog serial mode signals to parallel mode signals, means for sampling the amplitude of said parallel mode signals for every predetermined duration for converting said parallel mode signals to a PAM signal, Hadamard matrix means connected to convert said PAM signal to an equivalent signal, recording/means having a plurality of fixed magnetic heads for recording the output of said matrix circuit on a magnetic medium, reading means having a plurality of fixed magnetic heads for reading data on said magnetic medium, an inverse Hadamard matrix circuit connected to convert the output of said second-mentioned magnetic heads to an equivalent parallel PAM signal, means for converting said last-mentioned parallel PAM signal to a serial PAM signal, and means for converting said serial PAM signal to an analog signal, wherein the number of magnetic heads in said plurality of fixed magnetic heads is less than the number of the power of the Hadamard matrix of the Hadamard matrix means.

4,048,659

AUTOMATIC CASSETTE REPRODUCING APPARATUS

August A. Fink, Jr., Darien, Conn., and Noel J. Mackisoc, Newton, N.J., assignors to August A. Fink, Jr., Darien, Conn.

Continuation of Ser. No. 473,357, May 28, 1974, abandoned.
This application Mar. 5, 1976, Ser. No. 664,088
Int. Cl.[2] G11B *15/18*
U.S. Cl. 360—72 7 Claims



2. An automatic cassette reproducing apparatus for use with a cassette tape with an audio program and a control signal thereon comprising:

a housing adapted to receive said cassette;

cassette tape transport means within said housing for engagement with and transportation of said tape;

said transport means in a first mode adapted to advance the tape at a normal speed at which the audio program thereon can be transmitted to a listener and adapted to be shifted to a second mode to advance the tape at a faster speed to a later portion of the audio program while permitting continuous advancement of the tape by the transport means;

lock means on the housing to automatically retain the transport means in one of said modes for a predetermined length of time;

control means in the housing to automatically activate and deactivate the lock means in response to the control signal on the tape without affecting continuous advancement of the tape;

the lock means retaining the transport means in the first mode for a designated portion of the audio program; and

the control signal being inaudible and appearing intermittently on the tape to activate the lock means and retain the

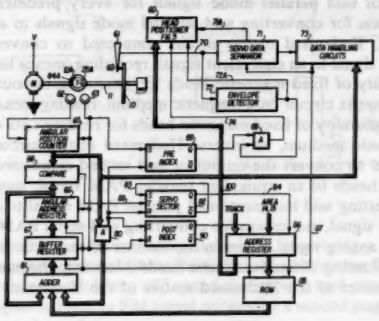
transport means in the first mode for predetermined periods of time during which the transport means cannot be shifted from the first mode.

4,048,660

RECORD TRACK FOLLOWING AND SEEKING

James Clifford Dennison, Broomfield, Colo., and Hjalmar Holmboe Ottesen, Oslo, Norway, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1975, Ser. No. 643,892
Int. Cl.[2] G11B *5/58, 17/00, 21/10*
U.S. Cl. 360—77 56 Claims



1. A record member having means for identifying track locating lines for locating parallel record tracks, respectively, said lines being spaced a given distance;

improved track locating line identification patterns, including in combination:

first and second groups of servo signals aligned transversely to said lines and said groups disposed longitudinally along said lines;

each servo signal having an extent transverse to said lines of about said given distance and having differing durations such that servo signals of shorter durations in one of said groups are longitudinally adjacent servo signals of longer durations in another of said groups; and

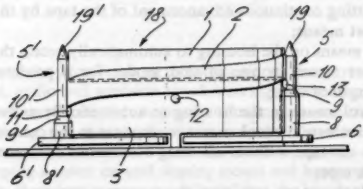
predetermined ones of said servo signals abutting one of said locating lines and other predetermined ones of said servo signals being centered on said locating lines.

4,048,661

DEVICE FOR GUIDING AND WINDING MAGNETIC TAPE IN RECORDING AND/OR REPRODUCING APPARATUS

Theophiel Clement Jozef Lodewijk Staar, Kraainem, Belgium, assignor to Staar, S.A., Brussels, Belgium

Filed July 29, 1975, Ser. No. 600,088
Claims priority, application France, Aug. 5, 1974, 74.27183
Int. Cl.[2] G11B *15/66*
U.S. Cl. 360—130 4 Claims



1. In apparatus for positioning and guiding magnetic tape around the drum of a rotary head assembly in a recording and/or reproducing mechanism having at least two guide fingers for guiding the magnetic tape and mounted for movement between a retracted position where the guide fingers engage the magnetic tape in a self-contained cartridge, and an advanced position where the guide fingers dispose the tape along a predetermined helical path on the drum surface, the improvement comprising

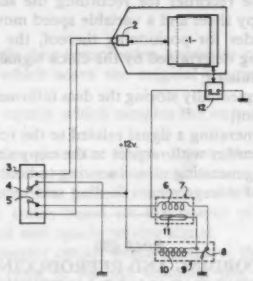
a plurality of guide surfaces projecting from the drum and having convex heads cooperating with said guide fingers for guiding the tape onto said predetermined helical path on the drum surface when the guide fingers are moved from said retracted position to said advanced position, and for maintaining the tape on said helical path during relative movement of the tape and rotary head assembly.

4,048,662

DEVICE FOR AVOIDING ACCIDENTS WHEN CLOSING A MOVABLE PANEL, FOR EXAMPLE THE PANEL OF AN ELECTRICALLY CONTROLLED SLIDING ROOF

Philippe Burguburu, Hericourt, France, assignor to Automobiles Peugeot, Paris, France

Filed Apr. 15, 1976, Ser. No. 677,298
Claims priority, application France, May 7, 1975, 75.14308
Int. Cl.[2] H02H *7/085*
U.S. Cl. 361—31 1 Claim



1. A device for avoiding accidents when closing a movable panel, comprising an electric motor for driving said panel between an open position and a closed position, means for connecting the motor to a power supply, means for cutting off the power supply connecting means when the torque furnished by the motor during the displacement of said panel between said positions exceeds a predetermined value, and means for inhibiting said cut-off means when said panel is located in the immediate vicinity of its closed position, wherein said cut-off means comprise a first electromagnetic relay having a coil, a second electromagnetic relay having a coil connected in a first switch capable of being controlled by the coil of the second relay, a second switch capable of being controlled by the first relay, the coil of the first relay being connected in series with the motor and with the first switch, the coil of the second relay being connected between the power connecting means and earth in series with the second switch and the inhibiting means.

4,048,663

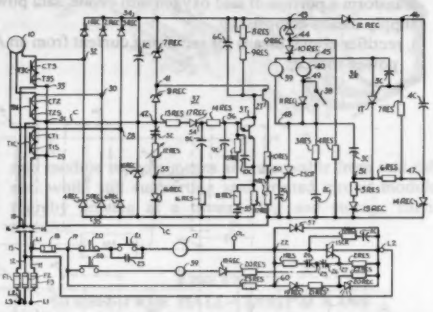
SOLID STATE OVERLOAD RELAY TRANSFORMER CIRCUIT

Winfred R. Lemke, Mequon, Wis., assignor to Square D Company, Park Ridge, Ill.

Filed Feb. 2, 1976, Ser. No. 654,423
Int. Cl.[2] H02H *3/08, 7/08*
U.S. Cl. 361—75 16 Claims

5. A device for protecting an alternating current motor from abnormal motor currents comprising: at least one current transformer having a magnet iron core surrounding at least a

portion of a conductor connecting the motor to an alternating current source and a secondary winding wound on the core to provide an alternating polarity output in response to the alternating current in the conductor, a current level sensing circuit including a first capacitor and a switching device having an input connected to the first capacitor for providing an output when the charge across the first capacitor exceeds a preadjusted level, a resettable trip circuit including a bistable element connected to be switched to a tripped state in response to a sensing circuit output, means for causing the motor circuit to be interrupted when the element is in its tripped state, and means including a second capacitor for providing energy for



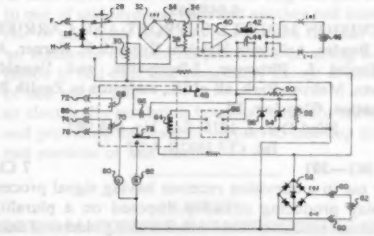
causing the element to switch to its reset state a predetermined time interval after the element is switched to its tripped state and circuit means connected to the secondary winding providing a charging circuit for the first capacitor and a charging circuit for the second capacitor, said charging circuits including diodes poled in their associated charging circuit so the first capacitor and the second capacitor are charged by opposite polarity rectified half wave output current pulses of the secondary winding and an impedance in the charging circuit for the first capacitor for causing the second capacitor to be fully charged before the charge on the first capacitor reaches the preadjusted level.

4,048,664

PROTECTIVE CIRCUIT FOR DYNAMIC BRAKING RESISTORS

Victor V. Kirilloff, Murrysville, Pa., assignor to Mosebach Manufacturing Company, Pittsburgh, Pa.

Filed July 9, 1976, Ser. No. 703,896
Int. Cl.² H02H *3/04*
U.S. Cl. 361—89 **6 Claims**



1. A circuit for protecting a pair of dynamic brake resistors when either of two motors driving fans for cooling the resistors fails, comprising:

a. a sensing circuit means having an input coupled to terminals of each of the motors and an output coupled to the input through voltage dropping impedances so as to substantially reduce the electrical energy from the input to the output; and

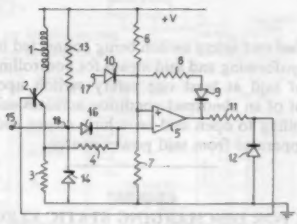
b. a switch means coupled to the output of the sensing circuit means, the switch means removes power to the dynamic brake resistors when the output from the sensing circuit reaches a certain level thereby protecting the resistors from overheating when there is a failure of either motor driving the cooling fans.

4,048,665

DRIVER CIRCUIT FOR PRINTER ELECTROMAGNET

Bruno Lia, and Giorgio Vigini, both of Milan, Italy, assignors to Honeywell Information Systems Italia, Milan, Italy

Filed Dec. 17, 1975, Ser. No. 641,859
Claims priority, application Italy, Dec. 20, 1974, 30809/74
Int. Cl.² H01H *47/32*
U.S. Cl. 361—152 **8 Claims**



1. A driver circuit for supplying the winding of an electromagnet with a controlled current provided by an unregulated voltage source, comprising:

a switch connected in series with said winding;

a current detector coupled to detect the current flowing in said winding and to deliver a voltage signal related to the current flowing in said winding;

a reference circuit for generating a reference voltage whose level varies as a predetermined function of the voltage provided by said source; and

a controllable bistable device operable in either one of first and second stable states and transferrable from the one of said states in which it is operating to the other of said states upon receipt thereby of a respective trigger signal, said device delivering an output signal when said device is operating in said first state, said device being transferred to said first state upon receipt of an input command signal and being transferred to said second state when the level of said voltage signal exceeds the level of said reference voltage, said output signal enabling said switch to transfer current through said winding.

4,048,666

ELECTRIC SAFETY SWITCH CIRCUITRY

Yutaka Irie; Tomoji Murata, both of Toyokawa; Kenji Shibazaki, Aichi; Shunji Yamamoto, Shinshiro; Shigemitsu Shimizu, Toyokawa, and Yukio Tokura, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 638,269, Dec. 5, 1975, abandoned. This application Apr. 15, 1976, Ser. No. 677,088
Claims priority, application Japan, Dec. 5, 1974, 49-140794; Dec. 25, 1974, 49-4482[U]
Int. Cl.² H01H *47/00*
U.S. Cl. 361—189 **9 Claims**

1. An electric safety switch circuit for use in an apparatus having at least one safety switch for detecting at least one abnormal condition of said apparatus, comprising:

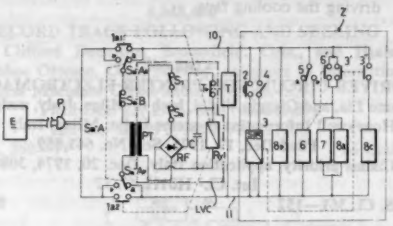
a main electric power source for providing power to said electric circuit and said apparatus;

switching means connected between said power source and said apparatus;

means responsive to the voltage of said main electric power

source for transforming the voltage thereof to a lower voltage;

means for controlling said switching means to open or close the same;



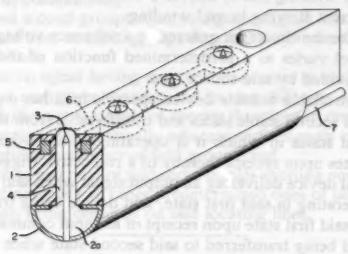
said at least one safety switch being connected to said means for transforming and said means for controlling and actuation of said at least one safety switch upon detection thereof of an abnormal condition actuates said means for controlling to open said switching means and disconnect said apparatus from said power source.

4,048,667

DEVICE FOR DISCHARGING STATIC ELECTRICITY

Hermann Brennecke, Schwambstrasse 37, 61 Darmstadt, Germany

Filed Aug. 10, 1976, Ser. No. 713,237
Claims priority, application Germany, Aug. 13, 1975, 2536091
Int. Cl.[2] H05F *3/00*
U.S. Cl. 361—213 **15 Claims**



1. A device for discharging static electricity by means of an electric glow discharge comprising

a plurality of needle electrodes,

first means for supporting said needle electrodes in spaced parallel relationship,

a plurality of conductivity interconnected ring electrodes,

second means for supporting said ring electrodes so that each ring electrode is positioned in coaxial surrounding relationship to a respective needle electrode, and

means for effecting high voltage connection to said ring electrodes.

4,048,668

ELECTRICALLY DRIVEN HIGH VOLTAGE OZONATOR

John D. Von Bargen, Cypress, and Khalid U. Siddiqui, Westminster, both of Calif., assignors to Source Gas Analyzers, Inc., Garden Grove, Calif.

Filed May 9, 1975, Ser. No. 576,040
Int. Cl.[2] C01B *13/11*
U.S. Cl. 361—235 **10 Claims**

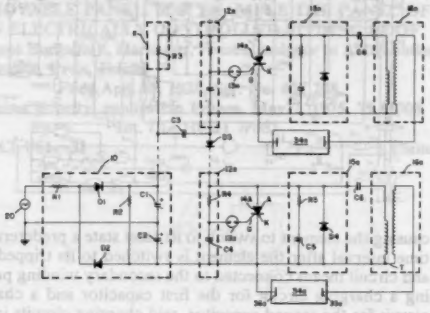
1. Apparatus for generating high concentrations of ozone in a high voltage ozonator driven by a solid state high voltage power supply, said apparatus comprising:

a. a corona generator comprising at least one ozonator cell including a high voltage electrode, a ground electrode spaced apart from said high voltage electrode and a layer of dielectric material between said electrodes, said layer being in contact with one of said electrodes and spaced a predetermined gap distance from the other said electrode, said cell being fabricated for a normal operating voltage range of 30,000 to 50,000 volts across said gap;

b. means for flowing an oxygen containing gas through said gap between said spaced apart electrodes; and

c. power supply means for establishing a potential difference in the range of 30,000 to 50,000 volts between said electrodes to establish a corona discharge therebetween to transform a portion of said oxygen into ozone, said power supply means comprising:

i. rectifier circuit means for rectifying current from an AC power source;



ii. solid state switching circuit means for interrupting said rectified current at a predetermined frequency;

iii. limiting impedance means for connecting said rectifier output to said solid state switching circuit means;

iv. timing circuit means and trigger component means for controlling the frequency of operation of said solid state switching circuit means; and

v. an auto-transformer of the automotive ignition coil type having its input winding connected by a coupling capacitor to said solid state switching circuit means and having its output connected across said electrodes of said ozonator cell to establish said potential difference therebetween, the capacitance of said cell forming a parallel tuned circuit with the output inductance of said auto-transformer.

4,048,669

TELEVISION MODULE SUPPORT AND CARRIER

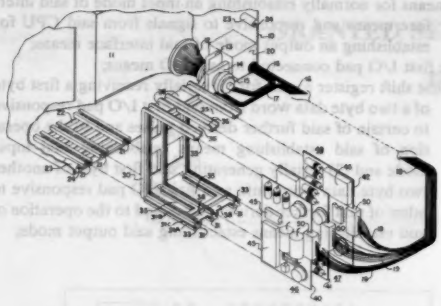
John W. Bowler, Arlington Heights; Kenneth E. Karner, Addison; Daniel I. Pittenger, Libertyville, and Donald A. Schwartz, Melrose Park, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Oct. 2, 1975, Ser. No. 618,987
Int. Cl.[2] H02B *1/02*
U.S. Cl. 361—391 **7 Claims**

1. For use in a television receiver having signal processing and display producing circuitry disposed on a plurality of printed circuit modules, cable means making electrical connections thereto, and a cabinet defining an enclosure and retaining means therein; module housing and transporting means comprising:

module support means, formed of nonconductive impact-absorbing material, defining a plurality of internal channels which accommodate said plurality of printed circuit modules and support them free of mechanical stresses either fully or partially inserted within said module support means while said cable means still maintain all said electrical connections and said module support means

remain within said cabinet; said module support means, coacting with said retaining means to position and retain said module support means within said cabinet such that



said module support means are removable from said cabinet, while still supporting said printed circuit modules, thereby serving as a transporting and storage carrier therefor.

4,048,670

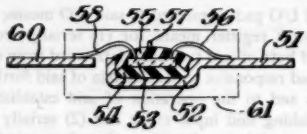
STRESS-FREE HALL-CELL PACKAGE

Hubert Eysermans, Wichita Falls, Tex., assignor to Sprague Electric Company, North Adams, Mass.

Filed June 30, 1975, Ser. No. 591,684

Int. Cl.[2] H05K *1/04*

U.S. Cl. 361—421 **7 Claims**



1. A stress-free hall-cell package comprising:

a. a semiconductor chip having a hall-cell formed therein and lying in one plane, said chip having conductive terminal pads on a surface thereof for providing electrical access to said hall-cell;

b. at least three metal leads, an end portion of each of said leads lying in and defining another plane that is essentially parallel with said one plane;

c. a cup abutting at least one of said metal leads;

d. at least three metal wires each having one end connected to one of said terminal pads and another end connected to one of said leads near said end portion thereof;

e. an insulative elastomeric protective covering being contained in said cup, and completely except at said one end of said wires; and

f. an electrically insulating housing means for encapsulating and providing mechanical support to said cup and to said end portions of said leads.

4,048,671

ADDRESS MATCH FOR DATA PROCESSING SYSTEM WITH VIRTUAL ADDRESSING

Robert William Callahan; Paul Eugene Kauffman, both of Endwell, and Matthew Joseph Mitchell, Jr., Endicott, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,400

Int. Cl.[2] G06F *9/06, 9/16, 13/00*

U.S. Cl. 364—200 **6 Claims**

1. Apparatus for detecting an address match in a data processing system having,

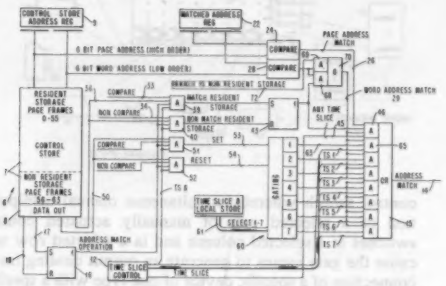
a store having a plurality of page frames and being accessible according to a first address having a page address portion and a word address portion, and

means for loading into a page frame of said store a page that is identified by a second address having a page address portion and a higher order bit portion, an address to be matched being uniquely identified by the combination of said second address and said word address portion of said first address,

wherein the improvement comprises,

means for holding the word portion of an address to be matched,

means connected to said means for holding the word portion of an address to be matched and connected to receive said word address portion of said first address for comparing the word portion of the address to be



matched and said word portion of said first address and for producing a word address match signal,

a register having a bit position for each of said page frames of said store, each bit position of said register being adapted to be set to identify any page frame containing the page in which the word to be matched is located,

means for identifying a page frame being accessed in said store, and

means connected to receive said word address match signal and connected to each bit position of said register and to said means for identifying a page frame being accessed in said store for signalling an address match in response to the coincidence of said word address match signal and an operation to access a page frame for which a bit in said register has been set.

4,048,672

SWITCH MATRIX CONTROL AND DISPLAY

Lewis J. Seiden, Tappan, N.Y.; William Landesberg, Norwalk, and Gladstone F. Young, Redding, both of Conn., assignors to T-Bar Incorporated, Wilton, Conn.

Filed Jan. 5, 1976, Ser. No. 646,580

Int. Cl.[2] G06F *3/00*

U.S. Cl. 364—200 **25 Claims**

1. A display and control system for a switching matrix in a data processing system for indicating and controlling device interconnection, each interconnecting node of the switching matrix including a plurality of switch elements operable together by coordinating actuator means to connect a selected data processing device to a selected peripheral device, comprising,

panel means having indicator elements arranged in a matrix pattern of columns and rows, the matrix being arranged so that each column represents a particular device of one kind and each row represents a particular device of the other kind,

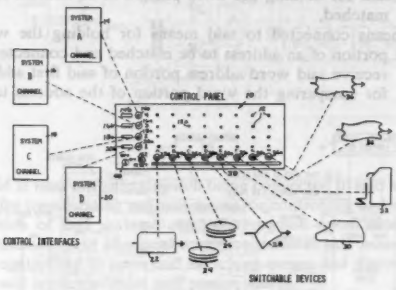
gate means corresponding to matrix nodes, each gate means having an output terminal and column and row input terminals, both of which input terminals must be energized simultaneously to produce an output at the output terminal,

output coupling means connecting each gate means with

associated coordinating actuator means and responding to an output at the output terminal of the gate means to cause such actuator means to interconnect its devices,

a plurality of manually actuated control switches, one for each data processing device and one for each peripheral device, each coupled to the appropriate input terminal of each of the gate means in its column or row,

energizing means associated with each manually actuated



control switch whereby simultaneous manual manipulation of a selected pair of manually actuated control switches in a selected column and in a selected row will cause the gate means to generate an output causing interconnection of a specific device of one type with a specific device of another type, and circuit means responsive to the manual actuation of the control switches for activating that indicator element in the panel means representative of the devices interconnected thereby.

4,048,673

CPU - I/O BUS INTERFACE FOR A DATA PROCESSING SYSTEM

Gardner Cox Hendrie, Carlisle, Mass., and Harold Springer Crafts, Saratoga, Calif., assignors to Data General Corporation, Westboro, Mass.

Filed Feb. 27, 1976, Ser. No. 662,180
Int. Cl.[2] G06F *3/00*
U.S. Cl. 364—200 **10 Claims**

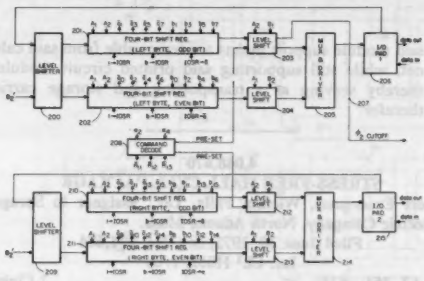
1. In a data processing system including (a) CPU with digital circuitry, (b) a main memory interfacing with said CPU, (c) I/O means for connecting between said CPU and peripheral devices, and (d) a clock source, interface means contained within said CPU for interfacing with said I/O means, said interface means comprising:

means for receiving pulses derived from said clock source and for deriving further pulses therefrom;

means for normally establishing an input mode of said interface means and responsive to signals from said CPU for establishing an output mode of said interface means;

a first I/O pad connected to said I/O means;

first shift register means for (1) serially receiving a first byte of a two byte data word from said first I/O pad responsive to certain of said further derived pulses and to the operation of said establishing means establishing said input mode and (2) serially generating said first byte of another two byte data word onto said first I/O pad responsive to other of said further derived pulses and to the operation of said establishing means establishing said output mode;



a second I/O pad connected to said I/O means;

second shift register means for (1) serially receiving the second byte of said two byte data word from said second I/O pad responsive to said certain of said further derived pulses and to the operation of said establishing means establishing said input mode and (2) serially generating said second byte of said another data word onto said second I/O pad responsive to said other of said further derived pulses and to the operation of said establishing means establishing said output mode; and

means for parallel transferring (1) said data word from said first and second shift register means to said digital circuitry and (2) said another data word from said digital circuitry to said first and second shift register means.

DESIGN PATENTS

GRANTED SEPTEMBER 13, 1977

ERRATA

For CLASS	See PATENT NO.
024–021	245,811
024–064	245,812

245,731

CHEST PROTECTOR FOR MOTORCYCLE RIDERS

Betty J. Bargsten, 1124 S. Lemon St., Apt. 11, Anaheim, Calif. 92805

Filed July 23, 1975, Ser. No. 598,392

Term of patent 14 years

Int. Cl. D2—*02*

U.S. Cl. D2—27

245,732

SHOE

Aubrey Askew, Southport, England, assignor to Dunlop Limited, London, England

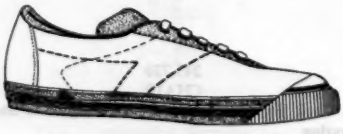
Filed Nov. 12, 1975, Ser. No. 631,074

Claims priority, application United Kingdom, May 13, 1975, 971052/75

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—310



245,733

SHOE

Aubrey Askew, Southport, England, assignor to Dunlop Limited, London, England

Filed Nov. 12, 1975, Ser. No. 631,075

Claims priority, application United Kingdom, May 13, 1975, 971051/75

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—310

245,734

SHOE SOLE

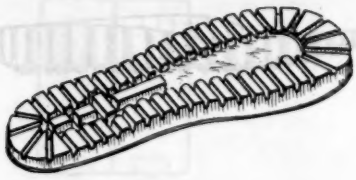
Raymond Jacobs, New York, N.Y., assignor to Kalso Systemet, Inc., New York, N.Y.

Filed June 18, 1975, Ser. No. 587,953

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—320



245,735

SANDAL SOLE

Tatsuo Fukuoka, No. 3, 3-Ban, 2-Chome, Shin-Minami-Fukushima, Tokushima, Japan

Filed Apr. 21, 1975, Ser. No. 569,959

Claims priority, application Japan, Dec. 26, 1974, 50-249; Dec. 26, 1974, 50-250

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—320

245,736

ATHLETIC SHOE SOLE

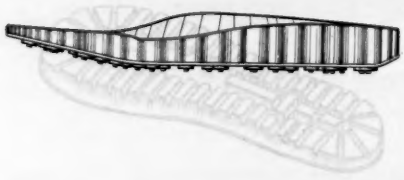
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 570,439, April 22, 1975, abandoned. This application Nov. 21, 1975, Ser. No. 634,128

Term of patent 14 years

Int. Cl. D2—*04*

U.S. Cl. D2—320



245,737

WRIST ATTACHABLE INSTRUMENT SUPPORT FOR A SCUBA DIVER OR THE LIKE

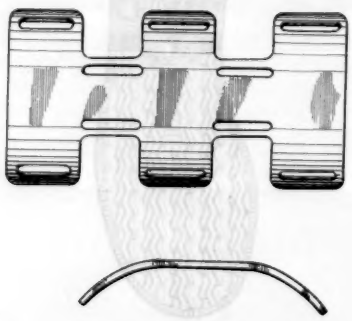
John F. Mayer, 420 River Road, Apt. D-6, Chatham, N.J. 07928

Filed Mar. 11, 1976, Ser. No. 665,887

Term of patent 3½ years

Int. Cl. D2—*99*

U.S. Cl. D2—400



245,738

ELECTRONIC DIP DISPENSER

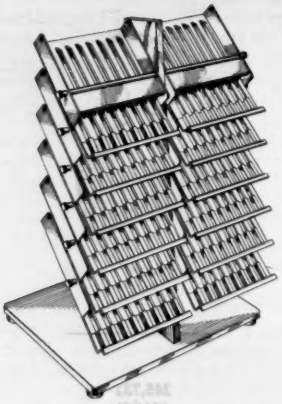
Lewis A. Latanzi, Bethel, Conn., assignor to Contact Systems, Inc., Danbury, Conn.

Filed Sept. 5, 1975, Ser. No. 610,552

Term of patent 14 years

Int. Cl. D6—*04*

U.S. Cl. D6—24



245,739

CHAIR

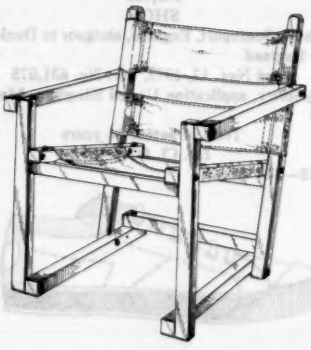
Victor J. Cook, Jr., New Orleans, La., assignor to Sud Model Corporation

Filed Mar. 10, 1976, Ser. No. 665,730

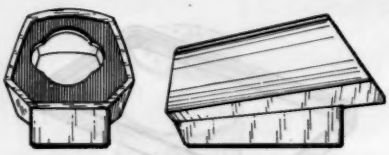
Term of patent 14 years

Int. Cl. D6—*01*

U.S. Cl. D6—69

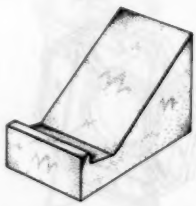


245,740
MAGNETICALLY MOUNTED SUPPORT FOR CIGARETTE LIGHTER
Herbert Richter, Pforzheim-Buchenbronn, Germany, assignor to Herbert Richter, Metallwaren-Apparatebau, Pforzheim-Buchenbronn, Germany
Filed Dec. 23, 1974, Ser. No. 536,931
Term of patent 14 years
Int. Cl. D6—*04;* D27—*05*
U.S. Cl. D6—85

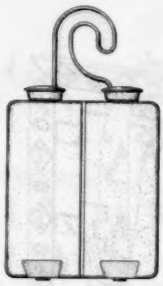


245,741
SKI HANGER
Bernard J. Putt, Star Route Box 169, Howard, Colo. 81233
Filed Jan. 28, 1976, Ser. No. 653,266
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—85

245,742
CALCULATOR SUPPORT STAND
Charles Wayne Sullivan, 3849 Dieckman Lane, Cincinnati, Ohio 45245
Division of Ser. No. 589,869, June 24, 1975. This application Oct. 15, 1976, Ser. No. 732,579
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

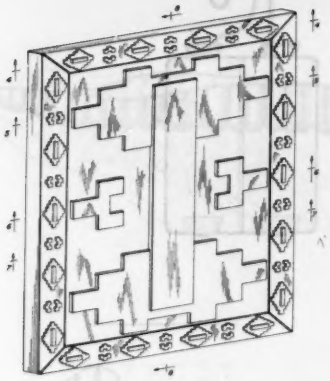


245,743
LIQUID DISPENSER
Patrick J. McManus, 6829 Gentry, North Hollywood, Calif. 91605
Filed Sept. 27, 1976, Ser. No. 727,214
Term of patent 14 years
Int. Cl. D23—*02;* D6—*04;* D9—*01*
U.S. Cl. D6—95

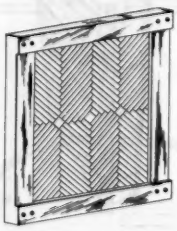


245,744
BOOKSHELF UNIT
Ronald A. Brooks, 2821 Hillegass, Berkeley, Calif. 94704
Filed Apr. 29, 1976, Ser. No. 681,397
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186

245,745
DOOR PANEL
James J. Palka, 1522 E. Peachtree Drive, Arlington Heights, Ill. 60004
Filed May 14, 1976, Ser. No. 686,676
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



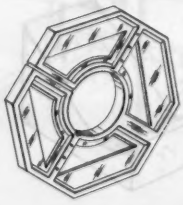
245,746
DOOR PANEL
James J. Palka, 1522 E. Peachtree Drive, Arlington Heights, Ill. 60004
Filed May 14, 1976, Ser. No. 686,677
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



245,747
BORDER STABILIZER FOR USE IN THE CONSTRUCTION OF A BOTTOM TYPE MATTRESS
Minoru Ikeda, Kokubunji, Japan, assignor to France Bed Co. Ltd.
Continuation of Ser. No. 317,156, Dec. 21, 1972, abandoned.
This application Jan. 24, 1975, Ser. No. 543,926
Claims priority, application Japan, Sept. 5, 1972, 47-39173
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—201

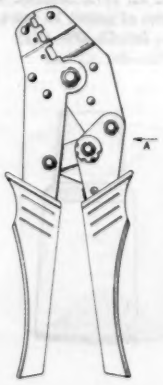
245,748
GARMENT HANGER
Henry D. Ostroll, Jackson Heights, N.Y., assignor to J. C. Penney Company, Inc., New York, N.Y.
Filed May 13, 1976, Ser. No. 685,993
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—252

245,749
WARDROBE SYSTEMIZER DEVICE
Franklin H. Henry, 1431 Prentice Drive, Healdsburg, Calif. 95448
Filed Dec. 22, 1975, Ser. No. 643,151
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257

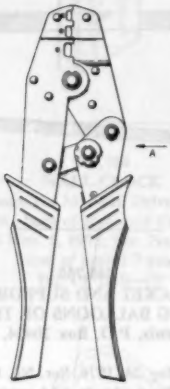


245,750
COMBINED GRATER AND CONDIMENT DISPENSER
Ewen M. Maclean, 88 Pleasant Blvd., Toronto, Canada
Filed Jan. 30, 1976, Ser. No. 636,680
Term of patent 7 years
Int. Cl. D7—*04, 06*
U.S. Cl. D7—47

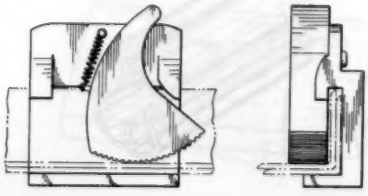
245,751
PAIR OF CRIMPING PLIERS
Hans Wiener, Taby, Sweden, assignor to Pressmaster AB, Stockholm, Sweden
Filed Mar. 4, 1976, Ser. No. 663,730
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—52



245,752
CRIMPING PLIERS
Hans Wiener, Taby, Sweden, assignor to Pressmaster AB, Stockholm, Sweden
Filed Mar. 4, 1976, Ser. No. 663,776
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—52

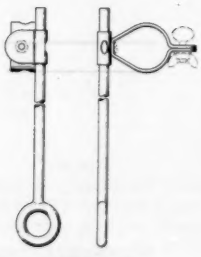


245,753
CHANNEL CLAMP
Anthony C. D'Atri, 7320 Ivandale Road, Independence, Ohio 44131
Filed July 2, 1976, Ser. No. 702,107
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—72



245,754
HACK SAW
Carl-Arne Breger, Malmo, Sweden, assignor to Sandvik Aktiebolag
Continuation-in-part of Ser. No. 382,656, July 26, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,322
Claims priority, application Sweden, Jan. 29, 1973, 195/73
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—96

245,755
COMBINED BRACKET AND SUPPORTING ARM FOR HOLDING BALLOONS OR THE LIKE
Nathanial Henry Lewis, P.O. Box 20424, Los Angeles, Calif. 90006
Filed May 24, 1976, Ser. No. 689,670
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—349



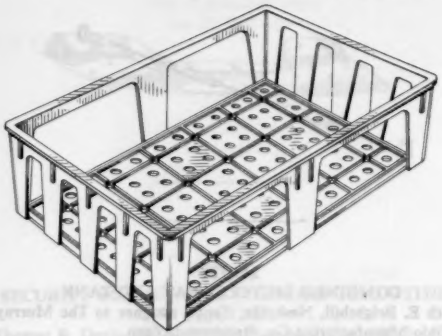
245,756
ROLL BAR FOR RETRACTABLE AWNINGS
Donald S. McKee, Louisville, Colo., assignor to The Scott & Fetzer Company, Lakewood, Ohio
Filed Nov. 28, 1975, Ser. No. 635,798
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—376

245,757
CUTTER PIN FOR MOWER
Gerald C. Fisher, and Joseph E. Scanland, both of Savannah, Ga., assignors to Roper Corporation, Kankakee, Ill.
Filed July 30, 1976, Ser. No. 710,263
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—391

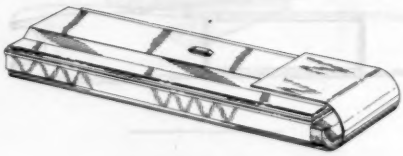
245,758
BOTTLE
John Pardo, Yonkers, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Dec. 12, 1975, Ser. No. 640,205
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—67

245,759
BOTTLE
John Pardo, Yonkers, N.Y., assignor to The Proctor & Gamble Company, Cincinnati, Ohio
Filed Dec. 12, 1975, Ser. No. 640,204
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—149

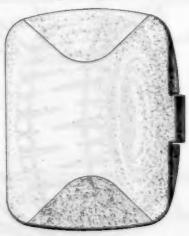
245,760
CASE FOR HOLDING CONTAINERS CARRYING BOTTLES
Theodor Box, 1108 Aileen Road, Brielle, N.J. 08730
Filed Jan. 22, 1976, Ser. No. 651,279
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—177



245,761
TONER POWDER SUPPLY CONTAINER
Gilmore N. Alseth, Richfield, and Richard D. Hipp, Jr., Harris, both of Minn., assignors to Minnesota Mining & Manufacturing Company
Filed Mar. 25, 1976, Ser. No. 670,450
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224



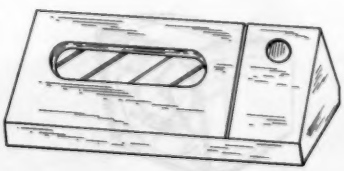
245,762
HINGED DISPLAY BOX
Donald K. Takacs, Wheaton, Ill., assignor to Richardson-Merrell Inc., Wilton, Conn.
Filed Apr. 7, 1976, Ser. No. 674,414
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—235



245,763
CARRIER BAG
Daniel A. Segura, Des Moines, Iowa, assignor to Great Plains Bag Corporation, Des Moines, Iowa
Filed Jan. 5, 1976, Ser. No. 646,431
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—249

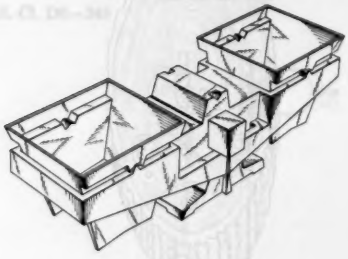
245,764
WALL CLOCK
Donald H. Jorgenson, 204 McPhail Drive, and Larry A. Knigge, 317 E. Fourth St., both of Redwood Falls, Minn. 56283
Filed Nov. 5, 1975, Ser. No. 628,942
Term of patent 7 years
Int. Cl. D10—*01*
U.S. Cl. D10—9

245,765
CLOCK
Yoshisaburo Yoshida, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jan. 22, 1976, Ser. No. 651,518
Claims priority, application Japan, July 29, 1975, 50-31535
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15

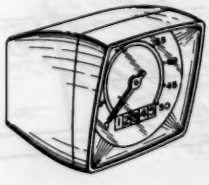


245,766
DIGITAL WRISTWATCH
Arthur Cruse, Dallas, Tex., assignor to E. Gluck Corporation, New York, N.Y.
Filed Aug. 18, 1975, Ser. No. 605,332
The portion of the term of this patent subsequent to Nov. 25, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

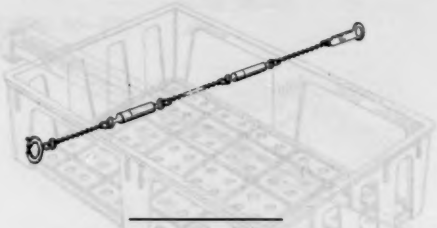
245,767
SCALE
Earl D. Myers, 947 Crestwood Road, Westfield, N.J. 07090
Filed Apr. 22, 1976, Ser. No. 679,394
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—90



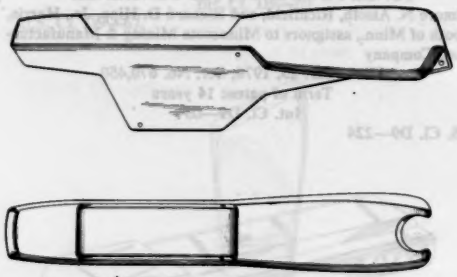
245,768
SPEEDOMETER
Howard J. Rasmussen, Fox River Grove, Ill., assignor to Stewart-Warner Corporation
Filed Dec. 18, 1975, Ser. No. 642,017
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—98



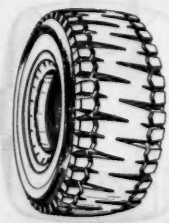
245,769
MAGNETIC MEDICAL NECKLACE
Masao Chihara, Matsudo, Japan, assignor to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 12, 1976, Ser. No. 675,781
Claims priority, application Japan, Oct. 16, 1975, 50-41590
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—13



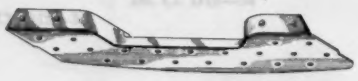
245,770
COMBINED BICYCLE SEAT AND TANK
Keith E. Brightbill, Nashville, Tenn., assignor to The Murray Ohio Manufacturing Co., Brentwood, Tenn.
Filed July 14, 1976, Ser. No. 705,170
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—126



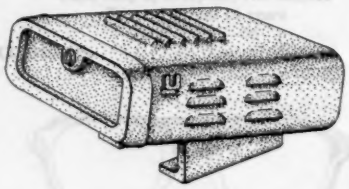
245,771
VEHICLE TIRE
Minoru Nakano, Tokorozawa, and Toshiro Tezuka, Higashi-Murayama, both of Japan, assignors to Bridgestone Tire Company Limited, Kyobashi, Japan
Filed Oct. 17, 1975, Ser. No. 623,479
Claims priority, application Japan, Apr. 17, 1975, 50-15040
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



245,772
OVERHEAD CONSOLE FOR VEHICLES
Thomas L. Drafton, 3156 Santa Anita Ave., El Monte, Calif. 91733
Filed July 8, 1976, Ser. No. 703,634
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

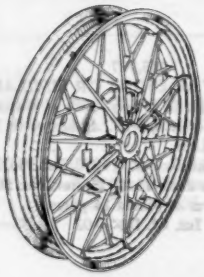


245,773
SECURITY BOX ADAPTED FOR MOUNTING WITHIN VEHICLES
Thomas R. Davis, 600 S. 45th St., Lincoln, Nebr. 68510
Filed Aug. 18, 1976, Ser. No. 715,476
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



245,774
VEHICLE BUMPER
Carl Vern Norris, 1201 Soda Lake Road, Fallon, Nev. 89406
Filed Nov. 1, 1976, Ser. No. 737,409
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—169

245,775
SPOKE WHEEL
Hans A. Muth, Hechendorf, Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Germany
Filed Sept. 17, 1976, Ser. No. 724,258
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205



245,776

ONE-POINT STEREO MICROPHONE

Fred Jay Dellar, Sun Valley, Calif., assignor to Superscope, Inc., Chatsworth, Calif.

Filed Jan. 8, 1976, Ser. No. 647,445

Term of patent 14 years

Int. Cl. D14—*01*

U.S. Cl. D14—12

245,777

FINANCIAL PROOF MACHINE OR SIMILAR ARTICLE

Harley J. Shawen; Ralph D. Haney, both of Waterloo, Canada, and Jerry L. Kohli, Ithaca, N.Y., assignors to NCR Canada Ltd - NCR Canada Ltee

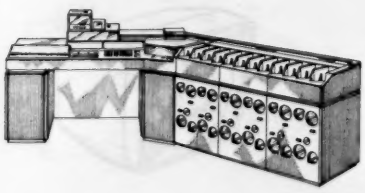
Division of Ser. No. 404,519, Oct. 9, 1973, Pat. No. Des. 238,282.

This application June 11, 1975, Ser. No. 586,009

Term of patent 14 years

Int. Cl. D14—*02*

U.S. Cl. D14—44



245,778

CITIZENS BAND ANTENNA

Frank F. Langner, 91 Willetts Drive, Boiling Spring Lakes, N.C. 28641

Filed June 21, 1976, Ser. No. 698,068

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—86

245,779

COMPRESSOR

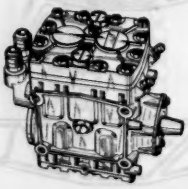
Tetsuo Nobata, Nagoya, Japan, assignor to Kabushiki Kaisha Unicla, Nagoya, Japan

Filed Dec. 29, 1975, Ser. No. 645,299

Term of patent 14 years

Int. Cl. D15—*02*

U.S. Cl. D15—9



245,780

COMBINED ADAPTER AND CUTTER EDGE UNIT FOR EXCAVATING, DIGGING OR BUCKET LOADING SHOVEL

Sten Johan Dahlberg, Kariskoga; Jouko Kalevi Korpi, Degerfors, both of Sweden, and Ulf Robert Larsson, Brampton, Canada, assignors to AB Bofors, Bofors, Sweden

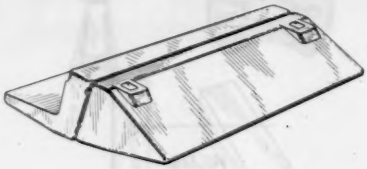
Filed Dec. 15, 1975, Ser. No. 641,101

Claims priority, application Sweden, June 19, 1975, 751269

Term of patent 14 years

Int. Cl. D15—*04*

U.S. Cl. D15—32



245,781

SAFETY SPECTACLES FRAME FRONT

Wayne W. Burkhardt, Spencer, Mass., and Robert R. Fischlein, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed May 3, 1976, Ser. No. 682,439

Term of patent 14 years

Int. Cl. D16—*06*

U.S. Cl. D16—65

245,782

MUSIC SHEET

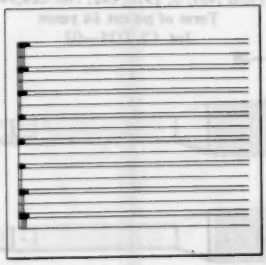
Wilbert G. Fritz, 305 N. Kenmore St., Arlington, Va. 22201

Filed Dec. 9, 1974, Ser. No. 530,997

Term of patent 14 years

Int. Cl. D19—*01*

U.S. Cl. D19—1



245,783

CONTAINER FOR WRITING AND STATIONERY ARTICLES

Walter Fieni, Paris, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

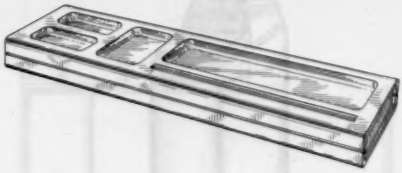
Filed May 13, 1975, Ser. No. 576,952

Claims priority, application France, Nov. 21, 1974, 74.350

Term of patent 14 years

Int. Cl. D19—*02*

U.S. Cl. D19—75



245,784

FISHING REEL

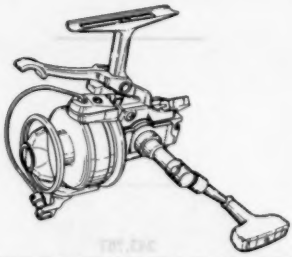
Kiyoshi Okada, Koganei, Japan, assignor to Daiwa Seiko, Inc., Higashi-kurume, Japan

Filed Sept. 13, 1976, Ser. No. 722,465

Term of patent 14 years

Int. Cl. D22—*05*

U.S. Cl. D22—25



245,785

PEANUT-SHAPED FISHING LURE

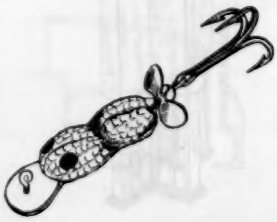
Benjamin W. Price, P.O. Drawer 16875, Jacksonville, Fla. 32216

Filed Sept. 7, 1976, Ser. No. 720,893

Term of patent 14 years

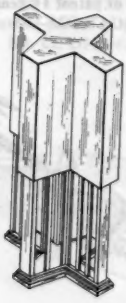
Int. Cl. D22—*05*

U.S. Cl. D22—28

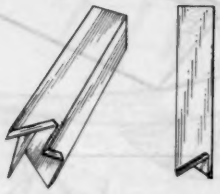


245,786
WATER SOFTENER CABINET
William J. Marsh, 1509 Rapids Drive, Racine, Wis. 53404
Filed July 28, 1976, Ser. No. 709,273
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3

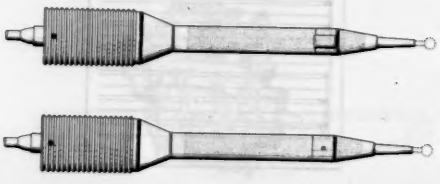
245,787
CONTAINER FOR DISSEMINATING INSECTICIDAL OR OTHER VAPORS
Charles R. Rhodes, Pleasant Hill, Calif., assignor to Shell Oil Company, Houston, Tex.
Filed May 7, 1976, Ser. No. 684,327
Term of patent 7 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



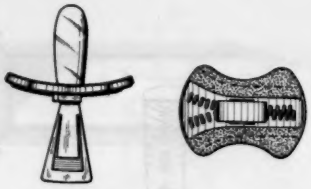
245,788
SURGICAL HAIR IMPLANTER
Robert P. Branch, 351 Alma Real Drive, Pacific Palisades, Calif. 90272, and Charles M. Monell, 104 Fremont Place, Los Angeles, Calif. 90005
Filed Oct. 29, 1976, Ser. No. 736,769
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—26



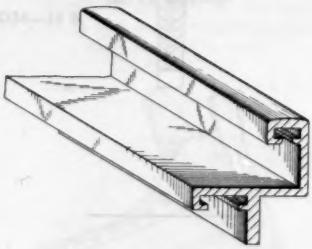
245,789
BONE DRILL
John J. Shea, and Harry Phillips, both of P.O. Box 4049, Memphis, Tenn. 38104
Filed Nov. 5, 1975, Ser. No. 628,941
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—28



245,790
PACIFIER
Paul K. Meeker, 412 Park, Kent, Ohio 44266, and Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44240
Filed Sept. 2, 1976, Ser. No. 719,982
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—45

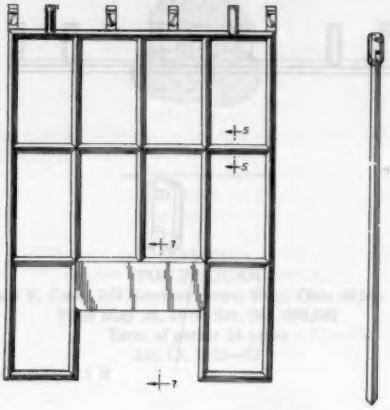


245,791
FRAME MOLDING
Greg Copeland, 114 Beach Terrace, Wayne, N.J. 07470
Filed June 1, 1976, Ser. No. 691,698
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

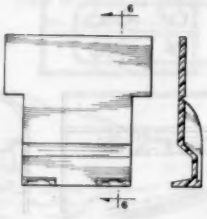


245,792
FENCE POST
Duayne D. Dougherty, 6807 N. 39th Ave., Phoenix, Ariz. 85019
Filed July 29, 1976, Ser. No. 709,768
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—77

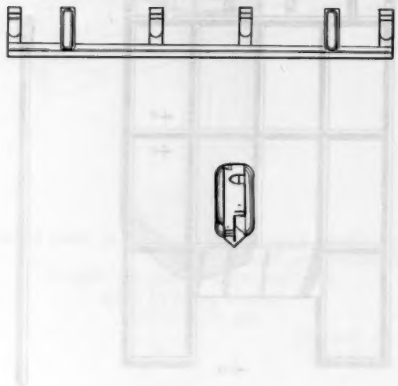
245,793
GATE FOR POULTRY CAGE
Donald L. DeMyer, c/o Cycle Systems Inc., 9290 Belding Road NE., Rockford, Mich. 49341
Filed July 6, 1976, Ser. No. 702,518
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—2



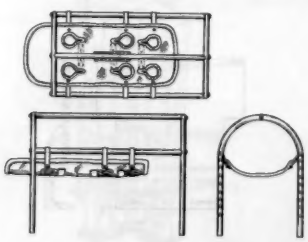
245,794
LATCH FOR POULTRY CAGE GATE
Donald L. DeMyer, c/o Cycle Systems Inc., 9290 Belding Road NE., Rockford, Mich. 49341
Filed July 7, 1976, Ser. No. 703,271
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—2



245,795
HINGE FOR POULTRY CAGE GATE
Donald L. DeMyer, c/o Cycle Systems Inc., 9290 Belding Road NE., Rockford, Mich. 49341
Filed July 7, 1976, Ser. No. 703,272
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—2

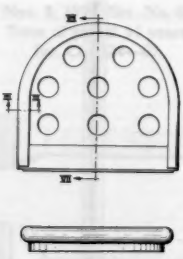


245,796
ANIMAL RESTRAINER
Norman C. Kaplan, 26556 Franklin Pointe, Southfield, Mich. 48034
Filed Sept. 27, 1976, Ser. No. 726,924
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—33



245,797
GOLF CLUB GRIP
Frank G. Hollendorfer, Akron, Ohio, assignor to Eaton Corporation
Filed Oct. 16, 1975, Ser. No. 623,215
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GS

245,798
GAME TARGET
Edmund F. Norden, 5157 Henry, Muskegon, Mich. 49441
Filed June 10, 1975, Ser. No. 585,617
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 NN



245,799
FOOTBALL PLAYER STANCE TRAINING DEVICE
Orley David Rogers, Farwell, Mich., assignor to Rogers Athletic Company, Farwell, Mich.
Filed Sept. 29, 1975, Ser. No. 617,297
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 R

245,800
ICE SKATE
Holger Bertil Ingvar Gustavsson, Nymilsgatan 5, 421 37 Vastra Frolunda, Sweden; Adolf Hensler, and Ferdinand Haizinger, both of Michael Gruberstr. 10, A 8580 Koflach, Austria
Filed May 10, 1976, Ser. No. 684,895
Term of patent 14 years
Int. Cl. D21—*08*
U.S. Cl. D34—14 B

245,801
ADJUSTABLE LOOP FOR A SKI POLE
Trygve Leljedahl, Lillehammer, Norway, assignor to Trygve Liljedahl Skistavfabrikk A/S
Filed Feb. 4, 1976, Ser. No. 655,247
Claims priority, application Sweden, Aug. 5, 1975, 1495/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—14 D

245,802
TOY BEAR
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,085
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

245,803
TOY PELICAN
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,089
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

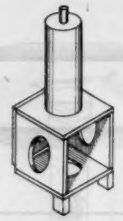
245,804
TOY WHALE
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,087
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

245,805
TOY SEAHORSE
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,086
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

245,806
TOY DOLPHIN
Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44266
Filed May 26, 1976, Ser. No. 690,083
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B

245,807
TOY WHISTLE
Duane Plank, 209 S. Vancouver, Kennewick, Wash. 99336
Filed Jan. 26, 1976, Ser. No. 652,629
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

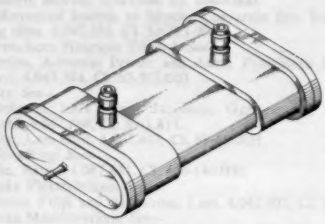
245,808
COMBINED END-TABLE AND LAMP PEDESTAL
James H. Stacey, 123 Cox St., Apt. No. 5, Auburn, Ala. 36830
Filed Mar. 8, 1976, Ser. No. 664,755
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 D



245,809
CASH REGISTER
Isao Kitai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed July 23, 1975, Ser. No. 598,857
Claims priority, application Japan, Jan. 27, 1975, 50-3684
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D52—4 A

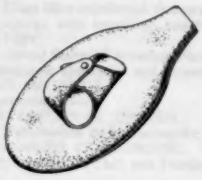
245,810
CASING FOR AN ELECTRONIC CALCULATOR
Leroy J. Lacelle, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Apr. 8, 1976, Ser. No. 674,801
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

245,811
FILTER FOR HEMODIALYSIS AND BLOOD OXYGENATION
Paul W. Gics, Santa Ana, Calif., assignor to Gics Pharmaceuticals, Inc., Santa Ana, Calif.
Filed Sept. 17, 1975, Ser. No. 614,263
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—21



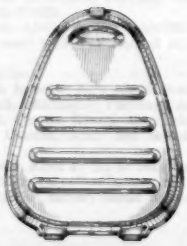
245,812
MEDICAL CORRECTIVE BODY BRACE
Ronald Tosoonian, 11891 Gladstone Drive, Santa Ana, Calif. 92705
Filed June 9, 1975, Ser. No. 585,106
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—64

245,813
COMBINED TENNIS RACQUET COVER AND BALL HOLDER
Patricia Lynn Davis, P.O. Box 21801, San Jose, Calif. 95151
Filed Sept. 8, 1975, Ser. No. 611,352
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



245,814
HANDBAG
Barney F. Ross, 3726 Marine St., Apartment 1, Santa Ana, Calif. 92704
Filed Jan. 19, 1976, Ser. No. 650,501
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 C

245,815
LUGGAGE OR SIMILAR ARTICLE
Noel L. Dunnavan, 16409 35th Ave. Northeast, Apt. B, Arlington, Wash. 98223
Filed Nov. 10, 1975, Ser. No. 630,095
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 F



DESIGN

CASH REGISTER

Isao Kisai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed July 27, 1979, Ser. No. 898,357

Claims priority, application Japan, Jan. 27, 1979, No. 6604

Term of patent 14 years

Int. Cl. D25—07

U.S. Cl. D25—4 A

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF SEPTEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See*—
Hoke, Jack B.; Graham, Richard; and Hoffman, Richard H., 4,047,821, Cl. 403-109.000.

A. B. Dick/Scott: *See*—
Gross, Frank C., 4,047,950, Cl. 96-1.0SD.

A. C. Nielsen Company: *See*—
Haselwood, Donald E.; Solar, Carl M.; and Thumm, Jeffrey R., 4,048,562, Cl. 325-31.000.

A/S Hymas: *See*—
Pabsdorff, Melvin, 4,047,486, Cl. 104-9.000.

Aarons, Raymond Joseph, to Monier Colourtile Pty. Ltd. Ridge cap holding clips. 4,047,353, Cl. 52-713.000.

Aarts, Franciscus Henricus Eduard: *See*—
Severijns, Adrianus Petrus; and Aarts, Franciscus Henricus Eduard, 4,047,394, Cl. 62-502.000.

AB Bofors: *See*—
Fredriksson, Lars Evert; Jacobson, Gunnar; and Olsson, Olof Bertil, 4,047,464, Cl. 89-1.811.
Lundin, Lars Olof, 4,047,467, Cl. 89-41.00H.

AB Jarnforadling: *See*—
Laurin, Arvid, 4,047,841, Cl. 416-140.000.

AB Svenska Flaktfabriken: *See*—
Knutsson, Filip; and Bergstrom, Lars, 4,047,907, Cl. 55-147.000.

AB Svenska Maskinverken: *See*—
Asplund, Frank Eskil William; and Engstrom, Axel Erik Konstantin, 4,047,559, Cl. 165-7.000.

AB Westin & Backlund: *See*—
Thyberg, Bertil Sven Johan; and Elmgren, Karl Arne Stig, 4,047,709, Cl. 269-22.000.

Abbott Laboratories: *See*—
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,048,254, Cl. 260-859.00R.
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Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.

Abell, Joseph L.: *See*—
Riendeau, William P.; Blevins, Robert R.; and Abell, Joseph L., 4,048,608, Cl. 337-74.000.

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Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, to American Home Products Corporation. Alkyl derivatives of 4,5-dehydro PGE_1. 4,048,329, Cl. 424-305.000.

Abt, Edgar John, to Motorola, Inc. Compact electrical fuze. 4,047,485, Cl. 102-80.000.

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Lahme, Norbert Wilhelm; and Sassmannshausen, Gunter C., 4,048,387, Cl. 429-50.000.

Ackerman, Leonard Stanley. Variable speed device. 4,047,451, Cl. 74-665.00H.

Adams, Frank C.: *See*—
Cooper, Shannon L.; and Adams, Frank C., 4,047,951, Cl. 96-27.00R.

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Adams, Guy Emery; and Pellegrin, Anna J., to Solitron Devices, Inc. Ignition system with gas discharge tube circuit. 4,047,513, Cl. 123-148.00E.

Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., to Boots Company Limited, The. Phenylalkanoic acids. 4,048,332, Cl. 424-317.000.

Adamson, Arthur P.: *See*—
Ravenhall, Richard; Salemme, Charles T.; and Adamson, Arthur P., 4,047,840, Cl. 416-135.000.

Adaniya, Takeshi; and Ohmura, Masaru, to Nippon Kokan Kabushiki Kaisha. Method for manufacturing an electro-galvanized steel sheet excellent in bare corrosion resistance and adaptability to chromating, and product thereof. 4,048,381, Cl. 428-632.000.

Addmaster Corporation: *See*—
Fuller, David W., 4,047,409, Cl. 70-356.000.

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Cieplik, Robert J.; and Czarnecki, Victor, 4,048,641, Cl. 354-10.000.
Croft, George Thomas, 4,047,946, Cl. 96-1.00R.

Adelberg, Marvin. Clamp for regulating flow through plastic-tubing. 4,047,694, Cl. 251-6.000.

Adelmann, Siegfried; Margotte, Dieter; and Merten, Josef, to Bayer Aktiengesellschaft. Glass fiber-reinforced thermoplastic polycarbonate molding compositions with improved tough-elastic properties. 4,048,133, Cl. 260-37.0PC.

Adolph, Horst G., to United States of America, Navy. Acetals derived from negatively substituted aldehydes and polynitro- or halonitroethanols. 4,048,219, Cl. 560-156.000.

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Klancnik, John H., 4,047,779, Cl. 339-9.00A.

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Chronberg, Sten, 4,048,037, Cl. 204-180.00R.
Francois, Bernard; Vernois, Michel; and Franta, Emile, 4,048,420, Cl. 526-173.000.

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Sakata, Okitsugu, 4,047,469, Cl. 90-11.00C.

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De Winter, Walter Frans; and Timmerman, Daniel Maurice, 4,047,957, Cl. 96-67.000.
Van Paesschen, August Jean; and Van Gossum, Lucien Janbaptist, 4,048,357, Cl. 427-387.000.

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Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,048,427, Cl. 526-337.000.

Aguilar, Manuel, Jr., to Johns-Manville Corporation. Sheet material attaching device and wall arrangement using this device. 4,047,349, Cl. 52-551.000.

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Riendeau, William P.; Blevins, Robert R.; and Abell, Joseph L., 4,048,608, Cl. 337-74.000.

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Uffner, Melville W., 4,048,086, Cl. 252-182.000.

Airco, Inc.: *See*—
Dorenbos, Frederick William, 4,047,624, Cl. 214-17.00B.
Hill, Russell J.; and Tsujimoto, Kazumi N., 4,048,462, Cl. 219-121.0EB.

Aitken, W. Sidney. Fitting and methods for making the same. 4,047,739, Cl. 285-21.000.

Ajax International Corporation: *See*—
Blevitt, Robert; and O'Brien, Miguel Eugene, 4,047,623, Cl. 214-17.00C.

Akimoto, Hiroshi: *See*—
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, 4,048,158, Cl. 260-239.100.

Akopian, Nikolai Rubenovich: *See*—
Tagirov, Kurban Magomedovich; and Akopian, Nikolai Rubenovich, 4,047,569, Cl. 166-308.000.

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Svensson, Nils David, 4,047,670, Cl. 241-92.000.

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Jacobsson, Kurt Arne Gunnar, 4,047,675, Cl. 242-47.010.

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Sundberg, Erik, 4,048,398, Cl. 429-140.000.

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Nedenskov, Poul; and Alster, Karol, 4,048,198, Cl. 260-347.400.

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Trostmann, Erik; and Albertsen, Ove, 4,047,478, Cl. 99-450.100.

Albrecht, Konrad; Langeluddeke, Peter; Schumacher, Hans; and Schwerdtle, Friedhelm, to Hoechst Aktiengesellschaft. Herbicidal agents. 4,047,932, Cl. 71-108.000.

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Sutherland, James Gordon, 4,047,354, Cl. 52-729.000.

Alderete, William Eugene; Boyer, John Parke; Daugherty, Kenneth Earl; and Johnson, David Lee, to General Portland, Inc. Cement composition. 4,047,961, Cl. 106-89.000.

Alderman, Robert J. Roof system. 4,047,345, Cl. 52-404.000.

Alderman, Robert J. Chicken wire roof and method of insulation. 4,047,346, Cl. 52-407.000.

Alexeenko, Vladimir Iosifovich: *See*—
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Alfenaar, Marinus; and Van Gasse, Rene L. E., to Stamicarbon B.V. Process for making an electrochemical cell or battery, e.g. a fuel cell or fuel cell battery, and a cell or battery made by the process. 4,048,386, Cl. 429-38.000.

Alfred Gutmann Gesellschaft fur Maschinenbau: *See—*
Zeidler, Johannes; and Von Borcke, Bernd, 4,047,843, Cl. 416-185.000.
Allegheny Ludlum Industries, Inc.: *See—*
Falkowski, Edward C.; and Ruppel, Carl E., 4,047,983, Cl. 148-105.000.
Wright, Roger N., 4,047,941, Cl. 75-126.00B.
Allen, Joseph C., to Texaco Inc. Oil recovery process utilizing air and superheated steam. 4,048,078, Cl. 252-8.55D.
Alliance Manufacturing Co., Inc., The: *See—*
Deming, Andrew F.; and Carli, Alvin J., 4,048,630, Cl. 340-274.00R.
Allis-Chalmers Corporation: *See—*
Harrer, Paul H.; and Langford, LeRoy, 4,047,638, Cl. 221-266.000.
Heian, Glenn A., 4,047,884, Cl. 432-21.000.
Mayo, Howard A., Jr.; and Swiecicki, Ignacy, 4,047,831, Cl. 415-1.000.
Mydels, John W., 4,047,823, Cl. 403-188.000.
Peterson, James F., 4,047,368, Cl. 56-202.000.
Stich, Frederick A., 4,048,554, Cl. 363-98.000.
Wagner, Robert L., 4,047,575, Cl. 172-311.000.
Allis, Robert F.; and Capaccio, Vincent A., to Xerox Corporation. Available light marginal illumination system. 4,047,811, Cl. 355-14.000.
Alster, Karol: *See—*
Nedenskov, Poul; and Alster, Karol, 4,048,198, Cl. 260-347.400.
Alvarado, Alfredo. Surgical stapler. 4,047,654, Cl. 227-19.000.
Amalberti, Jean Claude: *See—*
Lecart, Jean-Guy Pierre Denis; and Amalberti, Jean Claude, 4,047,450, Cl. 74-552.000.
AMAX Inc.: *See—*
Clark, George W.; and Dainty, Douglas H., 4,047,942, Cl. 75-133.500.
Amboss, Kurt: *See—*
Brewer, George R.; and Amboss, Kurt, 4,048,534, Cl. 313-293.000.
Amerace Corporation: *See—*
Smorzaniuk, Adam, 4,048,607, Cl. 337-53.000.
American Colloid Company: *See—*
Clem, Arthur G., 4,048,373, Cl. 428-454.000.
American Cyanamid Company: *See—*
Ando, Hiei; and Haacke, Gottfried, 4,048,372, Cl. 428-412.000.
Barber, William Austin; and Fetchin, John Allan, 4,048,226, Cl. 260-561.00N.
Casey, Donald James; and Epstein, Martin, 4,048,256, Cl. 260-860.000.
Hlavka, Joseph John; and Bitha, Panayota, 4,048,431, Cl. 536-17.000.
Perciaccante, Vincent Anthony; and Landi, Henry Patrick, 4,047,533, Cl. 128-335.500.
Remley, Kenneth Herald, 4,048,001, Cl. 156-331.000.
Saunders, Kenneth Worden, 4,048,114, Cl. 252-463.000.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,048,065, Cl. 210-58.000.
American Home Products Corporation: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,048,328, Cl. 424-305.000.
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,048,329, Cl. 424-305.000.
American Optical Corporation: *See—*
Park, Ernest D.; and Dianetti, Joseph C., 4,047,794, Cl. 350-54.000.
Ammann, Eugene O., to GTE Sylvania Incorporated. Laser apparatus for producing stimulated Raman scattering. 4,048,516, Cl. 307-88.300.
AMP Incorporated: *See—*
Carter, Clyde Thomas, 4,047,791, Cl. 339-260.000.
Forney, Edgar Wilmot, Jr.; and Hogendobler, Richard Shure, 4,047,788, Cl. 339-177.00R.
Yeager, Marvin Leo, 4,047,782, Cl. 339-75.0MP.
Zimmerman, Richard Henry, 4,048,438, Cl. 174-68.500.
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Hirs, Gene, 4,048,068, Cl. 210-80.000.
Anderson, Brian; Dalton, Raymond Frederick; and Rowbotham, Philip Martin, to Imperial Chemical Industries Limited. 5-(2-Hydroxyphenyl)tetrazolyl compounds. 4,048,187, Cl. 260-308.00D.
Anderson, Conrad V., to Pako Corportion. Demand driven clutch. 4,047,445, Cl. 74-230.400.
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Ando, Akiko: *See—*
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,048,155, Cl. 542-422.000.
Ando, Hiei; and Haacke, Gottfried, to American Cyanamid Company. Coating of cadmium stannate films onto plastic substrates. 4,048,372, Cl. 428-412.000.
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Antennas for Communications, Inc.: *See—*
Hubbard, Howard H.; and Walsh, Thomas P., 4,047,287, Cl. 29-600.000.
Antonini, Eraldo: *See—*
Molteni, Luigi; Vercesi, Gian Piero; and Antonini, Eraldo, 4,048,305, Cl. 424-177.000.
Antonova, Tamara Nikolaevna: *See—*
Kondratenko, Maria Stefanova; Nachev, Lyubomir Todorov; Dedova, Petrushka Atanassova; and Antonova, Tamara Nikolaevna, 4,048,339, Cl. 426-39.000.
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Aoyama, Syunichi: *See—*
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,047,510, Cl. 123-119.00A.
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Shindo, Takemasa; and Arai, Kenichiro, 4,048,470, Cl. 219-216.000.
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Arbrook, Inc.: *See—*
Stockum, Glenn Francis, 4,047,251, Cl. 2-168.000.
ARCO Polymers, Inc.: *See—*
Spicuzza, John P., Jr.; and Sutej, Joseph M., 4,048,208, Cl. 264-45.300.
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Arnold, Jerry L.; and Douthett, Joseph A., 4,047,981, Cl. 148-16.000.
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Venot, Jean, 4,047,374, Cl. 57-77.450.
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Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, 4,048,307, Cl. 424-180.000.
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Saito, Tsuyoshi; and Asano, Kiro, 4,048,222, Cl. 260-514.00J.
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Asfour, Emil S. Method of making cigarettes and a cigarette made according thereto. 4,047,536, Cl. 131-140.00C.
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Rast, Gustaf J., Jr.; Barley, Thomas A.; Hammond, Raiford L.; and Ashley, James R., 4,048,568, Cl. 325-363.000.
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Bick, Maurice; and DiMurro, Richard J., 4,048,043, Cl. 204-224.00R.

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Evans, Robert J., 4,048,059, Cl. 108-155.000.

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Reeve, Paul H., 4,047,845, Cl. 417-251.000.

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Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, 4,047,282, Cl. 29-432.000.

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Arnaud, Henry, 4,047,509, Cl. 123-119.00A.
Burguburu, Philippe, 4,048,662, Cl. 361-31.000.
Leveque, Rene, 4,047,443, Cl. 74-199.000.

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Chasar, Dwight William, 4,048,140, Cl. 260-45.95C.
MacMullin, Robert Burns, 4,048,046, Cl. 204-266.000.
Starmer, Philip Hubert, 4,048,261, Cl. 260-888.000.
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Bagli, Jehan F.: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,048,328, Cl. 424-305.000.
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Bagryantsev, Gennady Ivanovich: *See—*
Volkov, Vladimir Vladimirovich; Bagryantsev, Gennady Ivanovich; Larionov, Igor Grigorievich; Neermolov, Alexandr Filippovich; and Leontievsky, Valery Georgievich, 4,047,672, Cl. 241-175.000.

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Bair, Lester E., to Garden Pro, Inc. Apparatus for trimming vegetation. 4,047,299, Cl. 30-276.000.

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Grenier, Raymond P., 4,048,501, Cl. 250-367.000.

Baird, William G., Jr.; Holbrook, Stanley E.; and Platt, Jeremy A., to W. R. Grace & Co. Method for preparing a film of vinylidene chloride polymer. 4,048,428, Cl. 526-343.000.

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Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

Balchunas, Walter C.: *See—*
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Baldwin, Francis P.; Rae, James A.; and Ver Strate, Gary, to Exxon Research and Engineering Company. Method for preparing moisture curable polymers containing randomly distributed sites of conjugated olefinic unsaturation. 4,048,258, Cl. 260-879.000.

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Balthes, John; Balthes, Garry; and Palmer, William, 4,047,366, Cl. 56-63.000.

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Balthes, John; Balthes, Garry; and Palmer, William, 4,047,366, Cl. 56-63.000.

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Daxinger, Helmut, 4,048,039, Cl. 204-192.00P.

Bamford, Kenneth; and Clowes, John Roger, to Dosco Overseas Engineering Limited. Gathering arms for a mining machine. 4,047,762, Cl. 299-64.000.

Banks, Holly, Jr. Sleep-inducing/interrupting audio system. 4,047,377, Cl. 58-152.00B.

Barber, William Austin; and Fetchin, John Allan, to American Cyanamid Company. Copper catalyst for hydration of nitriles to amides. 4,048,226, Cl. 260-561.00N.

Barbier, Daniel; Ittel, Jean-Michel; and Poujois, Robert, to Commissariat a l'Energie Atomique. Method and a device for eliminating the residual error voltage of an amplifier. 4,048,574, Cl. 330-9.000.

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Barer, Sol J., to Celanese Corporation. Alkane diols as chemical pinching agents. 4,047,925, Cl. 71-78.000.

Barker, Noble G.: *See—*
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Burow, Burghard, 4,047,543, Cl. 138-155.000.

Barnaba, Pierluigi, to Centro Sperimentale Metallurgico S.p.A. Process for the preparation of reducing gases. 4,048,091, Cl. 252-373.000.

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Hramchenko, Jack; and Sibley, Murray J., 4,048,123, Cl. 252-545.000.
Sibley, Murray J.; Yung, Gordon H. K.; and Urrea, Petronio D., 4,048,122, Cl. 252-541.000.

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Barnhart, Thomas F., to United States Steel Corporation. Process for direct-reduction of iron-ore employing nuclear reactor-powdered catalytic reformer. 4,047,935, Cl. 75-34.000.

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Barrington, Burchus Q.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,047,564, Cl. 166-72.000.

Bartelmuss, Heinrich. Method of making an abrasion-resistant plate. 4,047,993, Cl. 156-89.000.

Bartlett, Ivan Robert, to Varian Techtron Proprietary Limited. Adjustable slit mechanism. 4,047,808, Cl. 350-271.000.

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Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.

Bartram, Derrick: *See—*
Bassendale, Derrick Arthur; and Bartram, Derrick, 4,047,546, Cl. 141-1.00R.

Bartrug, Norman G.; and McDaniel, Donald L., to PPG Industries, Inc. Method of testing glass fiber coating compositions. 4,047,429, Cl. 73-150.00R.

BASF Aktiengesellschaft: *See—*
Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, 4,048,047, Cl. 204-270.000.
Broecker, Franz Josef; and Schwarzmann, Matthias, 4,048,196, Cl. 260-346.110.
Bruenemann, Hilmar; and Stoeckelmann, Guenter, 4,048,074, Cl. 210-323.00T.
Elser, Wolfgang; and Epple, Gerhard, 4,048,199, Cl. 260-380.000.
Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, 4,048,414, Cl. 526-106.000.
Haaf, Franz; Hatzmann, Guenter; Herrle, Karl; and Simak, Petr, 4,048,260, Cl. 260-884.000.
Loewenberg, Gustav; Hartmann, Hans-Joerg; Schaefer, Dieter; Motz, Herbert; and Jakusch, Helmut, 4,048,375, Cl. 428-474.000.
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,048,116, Cl. 252-470.000.
Weitz, Hans-Martin; Kahr, Kurt; and Fischer, Rolf, 4,048,165, Cl. 544-166.000.
Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, 4,048,135, Cl. 260-40.00R.

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tion. Method and apparatus for filling containers. 4,047,546, Cl. 141-1.00R.

Battaglia, Jean M.: *See—*
Chen, James Ling; and Battaglia, Jean M., 4,048,309, Cl. 424-238.000.
Chen, James Ling; and Battaglia, Jean M., 4,048,310, Cl. 424-238.000.

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Clifford, John E., 4,048,383, Cl. 429-19.000.

Baumann, Ludwig G. Air bubbling mat for use in bathtubs for producing bubbling and full-foam baths. 4,048,266, Cl. 261-122.000.

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Soodak, Charles; Lessner, David L.; and Macemon, James H., 4,047,820, Cl. 356-244.000.

Bayer Aktiengesellschaft: *See—*
Adelmann, Siegfried; Margotte, Dieter; and Merten, Josef, 4,048,133, Cl. 260-37.0PC.
Bossert, Friedrich; and Vater, Wulf, 4,048,171, Cl. 260-256.40C.
Botta, Artur; and Rasp, Christian, 4,048,174, Cl. 260-283.0SY.
Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, 4,048,315, Cl. 424-249.000.
Kackstadter, Klaus; and Theidel, Hans, 4,047,887, Cl. 8-1.00W.
Lauer, Hubert; Schenk, Norbert; and Schwerdtel, Wulf, 4,048,242, Cl. 260-666.00A.
Meiser, Werner; Buchel, Karl Heinz; Kramer, Wolfgang; and Grewe, Ferdinand, 4,048,318, Cl. 424-269.000.
Mues, Volker; and Niggemann, Johannes, 4,047,921, Cl. 71-11.000.
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,047,923, Cl. 71-76.000.
Sackmann, Gunter; Kolb, Gunter; and Muller, Friedhelm, 4,048,422, Cl. 526-203.000.
Schmidt, Robert R.; Eue, Ludwig; and Draber, Wilfried, 4,047,929, Cl. 71-93.000.
Tresper, Erhard; Neuray, Dieter; and Freitag, Dieter, 4,048,200, Cl. 260-395.000.
Westphal, Jochen, 4,048,154, Cl. 260-205.000.
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,048,221, Cl. 260-512.00C.

Beck, Charles I.; and Layton, Roger M., to G. D. Searle & Co. 3-O-Alkanoylglyceric acids. 4,048,202, Cl. 260-410.600.

Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, to BASF Aktiengesellschaft. Electrochemical cell with bipolar electrodes. 4,048,047, Cl. 204-270.000.

Beecham Group Limited: *See—*
Brown, Allan Guildford; and Howarth, Thomas Trefor, 4,048,186, Cl. 260-307.0FA.
Clayton, John Peter; and Bentley, Peter Hubert, 4,048,320, Cl. 424-271.000.
Watts, Eric Alfred, 4,048,317, Cl. 424-267.000.

Beers, Charles James, to LDV Industries, Inc. Air drag reducer for motor freight vehicles. 4,047,747, Cl. 296-1.00S.

Begala, Arthur James, Jr.: *See—*
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,048,065, Cl. 210-58.000.

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Belke, William H.; Hafele, Joseph C.; Landen, Ernest W.; and Richards, Thomas J., to Caterpillar Tractor Co. Corpuscular energy beam produced microasperities. 4,047,984, Cl. 148-152.000.

Bell & Howell Company: *See—*
Miller, James A.; and Firkins, Morris L., 4,048,651, Cl. 358-8.000.

Bell, Richard L.; Desmond, John D.; and Hart, Joseph J., to Container Corporation of America. Composite package. 4,047,660, Cl. 206-620.000.

Bell Telephone Laboratories, Incorporated: *See—*
Bosik, Barry Sheldon, 4,048,551, Cl. 320-21.000.
Canniff, Ronald Jay; and Manfred, Mark Thomas, 4,048,448, Cl. 179-17.00E.
Crochiere, Ronald Eldon; Flanagan, James Loton; and Webber, Susan Anne, 4,048,443, Cl. 179-1.0SA.
DeNigris, Ernest Gerard; and Palette, Ralph John, 4,047,781, Cl. 339-17.00R.
McNees, Gary Keith, 4,048,451, Cl. 179-18.0AH.
Miedema, Hotze, 4,048,559, Cl. 324-57.0SS.
Oehring, Hans; and Rossomando, Philip Joseph, 4,048,452, Cl. 179-27.00D.
Peck, Richard John; and Tong, Shih Yung, 4,048,440, Cl. 178-69.100.
Rupp, Louis William, Jr.; and Walsh, Walter Michael, Jr., 4,048,555, Cl. 324-.5MA.
Stone, Dale Eugene, 4,048,552, Cl. 336-25.000.
Young, Charles Edwin, 4,048,441, Cl. 178-73.000.

Beloit Corporation: *See—*
Dahl, Carl B.; and Crouse, Jere W., 4,047,676, Cl. 242-66.000.

Belrico, Inc.: *See—*
Culver, Irven H.; and Szymber, Oleg, 4,047,447, Cl. 74-409.000.

Belyaev, Mikhail Fedorovich: *See—*
Karpov, Valentin Mikhailovich; Santo, Vladimir Rezhevich; Yanovsky, Viktor Yakovlevich; Mikhailov, Anatoly Ivanovich; and Belyaev, Mikhail Fedorovich, 4,047,428, Cl. 73-141.00A.

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Bender, Lloyd F.; and Schmid, Rolyn A., to Bender Machine Works, Inc. Milking apparatus and method for operating same. 4,047,500, Cl. 119-14.110.

Bender, Lloyd F., to Bender Machine Works, Inc. Bellows type expansible chamber pump having separate biasing means. 4,047,851, Cl. 417-412.000.

Bender Machine Works, Inc.: *See—*
Bender, Lloyd F.; and Schmid, Rolyn A., 4,047,500, Cl. 119-14.110.
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Bendix Corporation, The: *See—*
Orme, Myrl E.; and Vick, Ralph L., 4,047,540, Cl. 137-239.000.

Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, to Erickson Tool Company. Adjustable floating reamer. 4,047,829, Cl. 408-169.000.

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Bennett, Charles; and Toledo, Emil, to United States of America, Navy. Apparatus for making a memory wire. 4,048,048, Cl. 204-279.000.

Bennett, James M. Emergency signalling device. 4,047,798, Cl. 350-97.000.

Bennett, John T. Drill having indexable replaceable insert tip. 4,047,826, Cl. 408-59.000.

Bennett, Moreland P.; and Hobbs, Albert M., Jr., to General Electric Company. Method of welding a cover to a container. 4,048,460, Cl. 219-91.000.

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Bentley, Peter Hubert: *See—*
Clayton, John Peter; and Bentley, Peter Hubert, 4,048,320, Cl. 424-271.000.

Bentz, Francis: *See—*
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,048,221, Cl. 260-512.00C.

Benvegno, George J.: *See—*
Davies, Ronald F.; and Benvegno, George J., 4,048,092, Cl. 252-412.000.

Benzing, Walter C.: *See—*
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Eames, Loren W.; Berg, Joseph A.; and McAllister, Thomas W., 4,047,757, Cl. 297-230.000.

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Berger Industries, Inc.: *See—*
Weintraub, Burton L.; and Buda, Salvatore, 4,047,743, Cl. 285-340.000.

Berges, David A., to SmithKline Corporation. 7-Acyl-3-(sulfonic acid and sulfamoyl substituted tetrazolyl thiomethyl)cephalosporins. 4,048,311, Cl. 424-246.000.

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Bergmeister, Eduard: *See—*
Stoll, Alois; and Bergmeister, Eduard, 4,048,192, Cl. 260-33.40R.

Bergstrom, Lars: *See—*
Knutsson, Filip; and Bergstrom, Lars, 4,047,907, Cl. 55-147.000.

Bergstrom, Torsten, to Formac International AB. Sound insulating panels. 4,047,337, Cl. 52-71.000.

Berke, Julius B. Hot dog bun baking pan. 4,047,477, Cl. 99-428.000.

Berkowitz, Lewis M.: *See—*
Epstein, Joseph; and Berkowitz, Lewis M., 4,048,022, Cl. 204-1.00T.

Berman, Allen, to United States of America, Army. Projectile fall-back prevention means. 4,047,466, Cl. 89-14.00R.

Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, to Commissariat a l'Energie Atomique. Measuring detector and a method of fabrication of said detector. 4,047,436, Cl. 73-362.0SC.

Bernard, Jean-Michel; Labboz, Lucien; and Vesque, Daniel. Trunk circuit traffic analyzer. 4,048,450, Cl. 179-18.0EB.

Bernardi, James T. Frame structure. 4,047,341, Cl. 52-223.00R.

Berry, John F.: *See—*
Barcus, Lester M.; and Berry, John F., 4,048,454, Cl. 179-110.00A.

Berry Metal Company: *See—*
Chang, Yi-Chung, 4,047,936, Cl. 75-52.000.

Berson, Alain: *See—*
Kervizic, Jean; Deslandes, Claude; and Berson, Alain, 4,047,482, Cl. 102-19.200.

Berthelot, Guy, to Commissariat a l'Energie Atomique. Proportioning pump with pneumatic distributor. 4,047,850, Cl. 417-383.000.

Bertram, Jurgen; Brand, Wilhelm; and Schaeffer, Hans-Joachim, to Hermann Berstorff Maschinenbau GmbH. Continuously operable apparatus for the preparation and/or processing of synthetic plastics or rubber moulding compounds. 4,047,671, Cl. 241-66.000.

BFG Glassgroup: *See—*
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,047,351, Cl. 52-616.000.

Biasotti, Joseph B.: *See—*
Lee, Gary D.; Vartanian, Paul F.; and Biasotti, Joseph B., 4,048,080, Cl. 252-51.540.

Bich, John R., to Texaco Inc. Seismic playback/monitor system. 4,048,635, Cl. 340-347.0DA.

Bick, Maurice; and DiMurro, Richard J., to Auric Corporation. Selective plating apparatus. 4,048,043, Cl. 204-224.00R.

Bierbach, Herbert: *See*—
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Zolzer, Karlheinz, 4,047,901, Cl. 48-86.00R.

Biffi, Egidio. Flying object. 4,047,323, Cl. 46-47.000.

Bihuniak, Peter P.; and Guile, Donald L., to Corning Glass Works. Method of enhancing the refractoriness of high purity fused silica. 4,047,966, Cl. 106-69.000.

Bio/Data Corporation: *See*—
Eichelberger, James W.; Kent, Frederick M.; and Sokol, Michael, 4,047,890, Cl. 23-230.00B.

Biondetti, Mario, to Escher Wyss Limited. Deflection compensating roll. 4,047,273, Cl. 29-116.0AD.

Bisbing, Robert H., to Southco, Inc. Quick action fastener. 4,047,266, Cl. 24-221.00R.

Bishop, Walton B., to United States of America, Navy. Secondary Radar/IFF anti-target splitting azimuth determiner. 4,048,636, Cl. 343-6.5LC.

Bissot, Thomas Charles, to Du Pont de Nemours, E. I., and Company. Surface impregnated catalyst. 4,048,096, Cl. 252-430.000.

Bitha, Panayota: *See*—
Hlavka, Joseph John; and Bitha, Panayota, 4,048,431, Cl. 536-17.000.

Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Method of inhibiting histamine activity with quanidine compounds. 4,048,319, Cl. 424-269.000.

Black, Robin Michael, to John Wyeth & Brother Limited. Certain 2-substituted 4-phenylquinoline-4-ols. 4,048,177, Cl. 260-288.00R.

Blackburn, Tom L.; and Wisotzky, Otto G., to GTE Automatic Electric Laboratories Incorporated. Transistor amplifier stage with selectively adjustable gain control circuit. 4,048,576, Cl. 330-29.000.

Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., to GTE Sylvania Incorporated. Protective ultraviolet-transmitting sleeve for fluorescent lamp. 4,048,537, Cl. 313-489.000.

Blake, June Arlene, executrix: *See*—
Blake, Ralph Kingsley, deceased, 4,047,956, Cl. 96-60.00R.

Blake, Ralph Kingsley, deceased (by Blake, June Arlene, executrix), to Du Pont de Nemours, E. I., and Company. Low coating weight silver halide element and process. 4,047,956, Cl. 96-60.00R.

Blakey, Rene C.; Riddell, Robert G.; Whittaker, John; and Wilson, John A., to Star Paper Limited. Cast coated paper and its production and compositions for it. 4,048,380, Cl. 428-511.000.

Blass, Jaroslav, to Kawasaki Motors Corporation U.S.A. Snowmobile engine mount. 4,047,588, Cl. 180-64.00R.

Bleckmann, Hans-Wilhelm, to ITT Industries, Inc. Digital phase-locked loop for speed measurement, in particular for use in antiskid control systems. 4,047,766, Cl. 303-97.000.

Bledsoe, Jerry L.; and Lund, Clarence A., to Motorola, Inc. Method for manufacturing a high-speed semiconductor device. 4,047,976, Cl. 148-1.500.

Blessing, Hubert, to Levi Strauss & Co. Pallet feeding apparatus. 4,047,622, Cl. 214-8.50A.

Blevins, Robert R.: *See*—
Riendeau, William P.; Blevins, Robert R.; and Abell, Joseph L., 4,048,608, Cl. 337-74.000.

Blevitt, Robert; and O'Brien, Miguel Eugene, to Ajax International Corporation. Module loading device. 4,047,623, Cl. 214-17.00C.

Blue Giant Equipment Corporation: *See*—
Ellis, Arthur S., 4,047,698, Cl. 254-2.00R.

Blytas, George C. Process for removal of metal compounds from hydrocarbons. 4,048,061, Cl. 208-251.00R.

Boa, Niels Halfdan: *See*—
Nielsen, Mogens B.; Boa, Niels Halfdan; and Jensen, Jimmy, 4,047,722, Cl. 279-19.500.

Bockstiegel, Gerd-Edzard; Neidhardt, Manfred; and Rehfeld, Gerhard, to Dynamit Nobel Aktiengesellschaft. Heating element composition and method for preparing tube fillings of high electrical resistance from fused magnesium oxide for tubular electric heating elements. 4,048,119, Cl. 252-521.000.

Bode, Wolfgang W.: *See*—
Hinson, David C.; Bode, Wolfgang W.; Fein, Michael E.; and Hoehn, H. Joseph, 4,048,533, Cl. 313-188.000.

Boehringer Ingelheim GmbH: *See*—
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.

Boeing Company, The: *See*—
Foster, Gene B., 4,047,411, Cl. 72-7.000.
Hartel, Erwin H., 4,047,681, Cl. 244-102.0SS.
Kellogg, Richard Webster, 4,047,441, Cl. 74-52.000.

Boettcher, Klaus: *See*—
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.

Boettcher, Stephen A.: *See*—
McNamara, David M.; and Boettcher, Stephen A., 4,047,639, Cl. 222-64.000.
McNamara, David M.; and Boettcher, Stephen A., 4,047,640, Cl. 222-64.000.

Bogri, Tibor: *See*—
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,048,328, Cl. 424-305.000.
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,048,329, Cl. 424-305.000.

Bohn, Richard, to Transitron Electronic Corporation. Superintegrated V-groove isolated bipolar and VMOS transistors. 4,048,649, Cl. 357-43.000.

Boige, Jean, to L'Opochimie. Method of preparing enzyme cholic acids complex. 4,048,303, Cl. 424-94.000.

Bolcskei, Erno: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

Bolger, John C.: *See*—
Wisotzky, Reuben; and Bolger, John C., 4,048,269, Cl. 264-25.000.

Boliden AB: *See*—
Lagerstrom, Gosta Bertil; and Mattsson, Olof Arthur, 4,048,341, Cl. 426-69.000.

Bolli, Hans-Ulrich, to SIG Schweizerische Industrie-Gesellschaft. Apparatus for the transversal welding and severing of superposed webs. 4,048,003, Cl. 156-515.000.

Bollinger, Joseph M.: *See*—
Machleder, Warren H.; and Bollinger, Joseph M., 4,048,081, Cl. 252-51.50R.

Bond, Richard P. M.; Pryce, Robert J.; Raven, Clive A.; and Venis, Michael A. J., to Shell Oil Company. Wild oat herbicide mixture. 4,047,928, Cl. 71-88.000.

Bondarchuk, Walter W., Sr., to Lawrence Peska Assoc., Inc. Life saving apparatus. 4,047,257, Cl. 14-27.000.

Bonebreak, Robert L.: *See*—
Dale, C. Harold, Jr.; Howe, Spencer D.; Bonebreak, Robert L.; and Starkus, Charles J., 4,047,792, Cl. 350-6.000.

Boonthanoom, Niyom: *See*—
White, Martin; and Boonthanoom, Niyom, 4,048,349, Cl. 427-58.000.

Booth, Llewellyn D.: *See*—
Gurgiolo, Arthur E.; and Booth, Llewellyn D., 4,048,100, Cl. 260-2.5AJ.

Booth, Robert G. Protective helmet and face shield assembly therefor. 4,047,249, Cl. 2-10.000.

Boots Company Limited, The: *See*—
Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., 4,048,332, Cl. 424-317.000.
Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

Boozalis, Theodore S.; Cragar, Darryl E.; Ivy, John B.; and Willis, Gordon G., to Dow Chemical Company, The. Process for preparing 1,1,1-trichloroethane. 4,048,241, Cl. 260-658.00R.

Bor-, Cipo-, Szormeipari Kutato Intezet: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

Borba, Paul A.; and Miller, Harry R. Grooming implement for horses. 4,047,504, Cl. 119-92.000.

Borg-Warner Corporation: *See*—
Fogelberg, Mark John; and Kelbel, Donald William, 4,047,601, Cl. 192-36.000.
Jeffrey, Joseph O., 4,047,444, Cl. 74-229.000.

Borisenko, Alexandr Ivanovich: *See*—
Borzyak, Jury Gordeevich; Borisenko, Alexandr Ivanovich; Tjufilin, German Mikhailovich; Rolik, Alexandr Ivanovich; and Yakovlev, Alexandr Ivanovich, 4,048,280, Cl. 264-102.000.

Bormann, Alan Richard, to Motorola, Inc. Low power MOS RAM address decode circuit. 4,048,629, Cl. 340-173.0CA.

Borsotti, Giampiero: *See*—
Ribaldone, Giuseppe; and Borsotti, Giampiero, 4,048,173, Cl. 260-272.000.

Borzyak, Jury Gordeevich; Borisenko, Alexandr Ivanovich; Tjufilin, German Mikhailovich; Rolik, Alexandr Ivanovich; and Yakovlev, Alexandr Ivanovich. Method of manufacturing electrotechnical articles. 4,048,280, Cl. 264-102.000.

Boschetti, Egisto; Moroux, Yvette Paule Nicole; and Tixier, Rene, to Produits Chimiques Ugine Kuhlmann. Dried rehydratable film containing agarose or gelose and process for preparing same. 4,048,377, Cl. 428-474.000.

Bosik, Barry Sheldon, to Bell Telephone Laboratories, Incorporated. Battery charging circuit. 4,048,551, Cl. 320-21.000.

Bossert, Friedrich; and Vater, Wulf, to Bayer Aktiengesellschaft. 1,4-Dihydropyridines. 4,048,171, Cl. 260-256.40C.

Bosshard, Ernst, to Sulzer Brothers Limited. Method and apparatus for treating flowable material. 4,048,504, Cl. 250-434.000.

Boswell, Donald D., to Hughes Aircraft Company. Method and apparatus for erasing scattering in storage-type liquid crystals by frequency sweeping. 4,048,628, Cl. 340-173.0LM.

Boter, Pieter Abraham, to U.S. Philips Corporation. Electrode for primary or secondary battery and method for producing such an electrode. 4,048,407, Cl. 429-217.000.

Botta, Artur; and Rasp, Christian, to Bayer Aktiengesellschaft. Process for preparing 1,2-fused-1,3-dinitrogen-heterocyclic compounds. 4,048,174, Cl. 260-283.0SY.

Bottorff, Elwin G.: *See*—
Postman, John R.; and Bottorff, Elwin G., 4,047,344, Cl. 52-390.000.

Bouchard, Robert Joseph; and Brixner, Lothar Heinrich, to Du Pont de Nemours, E. I., and Company. Dielectric powder compositions. 4,048,546, Cl. 361-321.000.

Boudier, Juergen: *See—*
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig. 4,048,116, Cl. 252-470.000.

Boulva, Paul. Panel assembly. 4,047,342, Cl. 52-239.000.

Bouton, John C., Jr.: *See—*
Hart, Donald J.; Bouton, John C., Jr.; and Poppel, Eugene H., 4,048,616, Cl. 340-146.3ED.

Bowden, Roy Dennis, to Imperial Chemical Industries Limited. Pyridyl-tetrahydropyrans and process for preparing same. 4,048,180, Cl. 260-297.00R.

Bowers, William L.: *See—*
Bennett, Moreland P.; and Bowers, William L., 4,048,463, Cl. 219-118.000.

Bowler, John W.; Karner, Kenneth E.; Pittenger, Daniel I.; and Schwartz, Donald A., to Zenith Radio Corporation. Television module support and carrier. 4,048,669, Cl. 361-391.000.

Boyce, William D., II. Sea tent. 4,047,390, Cl. 61-69.00R.

Boyer, John Parke: *See—*
Alderete, William Eugene; Boyer, John Parke; Daugherty, Kenneth Earl; and Johnson, David Lee, 4,047,961, Cl. 106-89.000.

Brand, Wilhelm: *See—*
Bertram, Jurgen; Brand, Wilhelm; and Schaeffer, Hans-Joachim, 4,047,671, Cl. 241-66.000.

Branson Ultrasonics Corporation: *See—*
Mims, Bruce L., 4,047,657, Cl. 228-103.000.

Braun, Ernst: *See—*
Aulmann, Herbert; Braun, Ernst; and Braun, Gert, 4,047,673, Cl. 241-186.00R.

Braun, Gert: *See—*
Aulmann, Herbert; Braun, Ernst; and Braun, Gert, 4,047,673, Cl. 241-186.00R.

Brdr. Schur International A. S.: *See—*
Lister, Edward Alan; and Clarke, Graham Wilson, 4,047,362, Cl. 53-189.000.

Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, to Bayer Aktiengesellschaft. Preparation of new 1,3-identically substituted-triaz...e-2,4-diones. 4,048,315, Cl. 424-249.000.

Breedis, John F.: *See—*
Watson, W. Gary; and Breedis, John F., 4,047,980, Cl. 148-12.70C.

Brennecke, Hermann. Device for discharging static electricity. 4,048,667, Cl. 361-213.000.

Brennen, Michael B.: *See—*
Thompson, Francis T.; and Brennen, Michael B., 4,048,521, Cl. 307-291.000.

Breveteam S.A.: *See—*
Tesch, Gunter H., 4,047,327, Cl. 47-9.000.

Brewer, George R.; and Amboss, Kurt, to Hughes Aircraft Company. Radial flow electron gun. 4,048,534, Cl. 313-293.000.

Breznak, Robert A.; and Parker, James A., to Celanese Corporation. Splice for use during the thermal stabilization of a flat multifilament band of an acrylic fibrous material comprising at least two segments. 4,048,277, Cl. 264-83.000.

Bricon, Jean-Pierre Luc, to International Harvester Company. Convertible grab bucket. 4,047,313, Cl. 37-187.000.

Bridgestone Tire Company Limited: *See—*
Maeda, Muneyoshi; Watanabe, Shigeo; Takahashi, Hidenori; and Sogi, Toshiyuki, 4,047,552, Cl. 152-361.00R.

Brinjevec, Heinz J. Solar to electrical energy converting system. 4,047,385, Cl. 60-641.000.

Brissonneau et Lotz: *See—*
Havard, Jean Francois Pierre Marie; Gaschet, Michel Marceau; and Charonnat, Henri Marie Dominique, 4,048,547, Cl. 318-488.000.

British Ceca Company Limited, The: *See—*
Worrall, Michael John, 4,047,904, Cl. 55-18.000.

British Uralite Limited: *See—*
Kingsbury, Herbert William, 4,048,366, Cl. 428-215.000.

Brittan, John L. Digital grade averager. 4,048,484, Cl. 235-156.000.

Brixner, Lothar Heinrich: *See—*
Bouchard, Robert Joseph; and Brixner, Lothar Heinrich, 4,048,546, Cl. 361-321.000.

Bro, Per, to P. R. Mallory & Co. Inc. Electrophysichemical device. 4,048,404, Cl. 429-199.000.

Broadwell, James E.: *See—*
Witte, Arvel B.; Broadwell, James E.; and Hook, Dale L., 4,048,586, Cl. 331-94.50D.

Broan Manufacturing Co., Inc.: *See—*
Wolbrink, David W., 4,047,775, Cl. 312-211.000.

Brodsky, Larry: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, 4,047,282, Cl. 29-432.000.

Broecker, Franz Josef; and Schwarzmann, Matthias, to BASF Aktiengesellschaft. Manufacture of butanediol and/or tetrahydrofuran from maleic and/or succinic anhydride via γ- butyrolactone. 4,048,196, Cl. 260-346.110.

Brokmann, Manfred; Sanders, Kurt; Sanders, Dieter; and Westhoff, Hermann. Hook and cord connection. 4,047,824, Cl. 403-209.000.

Brookes, Neil Roger; Ray, Martin George; Cohen, Joseph David; and McCarey, Thomas Joseph, to General Electric Company. Transient air temperature sensing system. 4,047,379, Cl. 60-39.09D.

Brooks, Edward F., to TRW Inc. Continuous row average sampling method and apparatus for stationary source gas streams. 4,047,437, Cl. 73-421.50A.

Brotzmann, Karl: *See—*
Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, 4,047,707, Cl. 266-222.000.

Brown, Allan Guildford; and Howarth, Thomas Trefor, to Beecham Group Limited. Antibacterial substituted azetidinones. 4,048,186, Cl. 260-307.0FA.

Brown, David B.: *See—*
Pell, Kynric M.; and Brown, David B., 4,047,816, Cl. 356-152.000.

Brown, Marlene J. Sailing device. 4,047,492, Cl. 114-39.000.

Brown, Silas A., to Buckbee-Mears Company. Shadow mask with plurality of recessed regions extending across mask in two directions. 4,048,536, Cl. 313-403.000.

Brown, Thomas D.: *See—*
Mitchell, Earl R.; Brown, Thomas D.; and Post, Beverley C., 4,047,879, Cl. 431-183.000.

Browne Packaging, Inc.: *See—*
Pelzek, Victor J., 4,048,378, Cl. 428-483.000.

Browne, Peter. Modular merchandising. 4,047,615, Cl. 211-88.000.

Brownhill, Frank Denison, to Rolls-Royce (1971) Limited. Fan cowl translation lock. 4,047,682, Cl. 244-110.00B.

Bruel, Per Wilhelm; Schioler, Holger; and Jensen, Johannes Tejlgaard. Pipe joint for radiator element of thin material. 4,047,516, Cl. 126-270.000.

Bruenemann, Hilmar; and Stoeckelmann, Guenter, to BASF Aktiengesellschaft. Apparatus for separating solids from liquids or gas. 4,048,074, Cl. 210-323.00T.

Brumlik, George, to Ingrip Fasteners, Inc. Fasces fibers. 4,048,371, Cl. 428-375.000.

Brummett, Marshall G.; Heckman, Russell W.; Nickey, George A.; and Taylor, James E., to Owens-Illinois, Inc. Method of assembling plastic wrap on a glass container. 4,048,281, Cl. 264-230.000.

Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, to Lonza Ltd. Process for the production of self-cross-linking lacquers. 4,048,130, Cl. 260-29.6NR.

Bubnick, Gerald Frank; and Urry, Lewis Frederick, to Union Carbide Corporation. Cathode or cathode collector arcuate bodies for use in various cell systems. 4,048,389, Cl. 429-101.000.

Buchel, Karl Heinz: *See—*
Meiser, Werner; Buchel, Karl Heinz; Kramer, Wolfgang; and Grewe, Ferdinand, 4,048,318, Cl. 424-269.000.

Buchs, Roland: *See—*
Hueber, Alfred; and Buchs, Roland, 4,047,837, Cl. 416-95.000.

Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, to Fiberlok, Inc. Polyester batt and method for producing such. 4,047,991, Cl. 156-62.600.

Buck, James R., to Buck Tool Company. Counterbalanced chuck. 4,047,723, Cl. 279-121.000.

Buck Tool Company: *See—*
Buck, James R., 4,047,723, Cl. 279-121.000.

Buckbee-Mears Company: *See—*
Brown, Silas A., 4,048,536, Cl. 313-403.000.

Buda, Salvatore: *See—*
Weintraub, Burton L.; and Buda, Salvatore, 4,047,743, Cl. 285-340.000.

Budd Company, The: *See—*
Germer, John A., 4,047,836, Cl. 416-39.000.
McCafferty, Gerald P., 4,047,655, Cl. 228-259.000.

Buechner, Oskar: *See—*
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.

Buess, Kenneth G.; and Hefter, Murray, to Singer Company, The. Variable reluctance stepper motor. 4,048,531, Cl. 310-49.00R.

Bullat, Jean, to Carpano & Pons. Drive mechanism and application to a blind with vertical slats. 4,047,554, Cl. 160-168.00R.

Bunker Ramo Corporation: *See—*
Marz, Frank Hubert, 4,047,376, Cl. 58-23.00D.

Bunri Kogyo Kabushiki Kaisha: *See—*
Nazuka, Iwao, 4,047,609, Cl. 198-690.000.

Bureau de Recherches Geologiques et Minieres: *See—*
Cuvillier, Roger; and Cohen-Alloro, Richard, 4,048,069, Cl. 210-84.000.

Burguburu, Philippe, to Automobiles Peugeot. Device for avoiding accidents when closing a movable panel, for example the panel of an electrically controlled sliding roof. 4,048,662, Cl. 361-31.000.

Burk, Duane L., to Caterpillar Tractor Co. Track link pin bore - hydraulically prestretched. 4,047,277, Cl. 29-421.00R.

Burkhardt, Gisbert; and Hofmann, Dieter, to Licentia Patent-Verwaltungs-G.m.b.H. Conveyor-distributor apparatus for flat items. 4,047,712, Cl. 271-64.000.

Burkhart, William H. Food cooking machine. 4,048,473, Cl. 219-389.000.

Burkin, Jury Alexandrovich. Method of manufacturing 3-D memories. 4,047,288, Cl. 29-604.000.

Burnham, Peter B., to Harsco Corporation. Lip lock with release and counterbalance for dock board. 4,047,258, Cl. 14-71.300.

Burns, Michael E.; and Pracht, Hans J., to Procter & Gamble Company, The. Cellulose ethers having a low molecular weight and a high degree of methyl substitution. 4,048,433, Cl. 536-99.000.

Burow, Burghard, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Guide apparatus for deflecting a linear structure. 4,047,543, Cl. 138-155.000.

BUSS A.G.: *See—*
Koller, Hans, 4,047,700, Cl. 254-89.00H.

Bu...riss, A. T., to Eaton Corporation. Worm gear clamping apparatus. 4,047,268, Cl. 24-274.00R.

Bymun, Edwin N.: *See—*
Packer, Lester; and Bymun, Edwin N., 4,048,325, Cl. 424-298.000.

C. Reichert Optische Werke, AG: *See—*
Steinbatz, Alfred, 4,047,818, Cl. 356-189.000.

C.S.S. Container Storage Service Establishment: *See—*
Kok, Bob; and Krause, Erhardt, 4,047,893, Cl. 23-254.00E.

Cabezut, Joseph M., Jr.: *See—*
LeFebvre, Clarence A.; and Cabezut, Joseph M., Jr., 4,047,382, Cl. 60-252.000.

Cahn, Robert P.; and Siskin, Michael, to Exxon Research and Engineering Company. Autorefrigerated isomerization process. 4,048,251, Cl. 260-683.680.

Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., to Tribotech. Protected bearing mount assembly. 4,047,768, Cl. 308-72.000.

Calabek, Milan: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.

Caldarelli, Antonio. Fluids distributor for energized-fluid systems. 4,047,880, Cl. 431-208.000.

Caldwell, Bruce J., to Tejas Instrument Engineers, Inc. Ink pen cartridge and mounting arm for a recording instrument. 4,048,640, Cl. 346-140.00A.

Caliendo, Joseph L. Aerosol device with telescoping container parts. 4,047,645, Cl. 222-386.500.

Callahan, Robert William; Kauffman, Paul Eugene; and Mitchell, Matthew Joseph, Jr., to International Business Machines Corporation. Address match for data processing system with virtual addressing. 4,048,671, Cl. 364-200.000.

Calundann, Gordon W.; and Powers, Edward J., to Celanese Corporation. Rendering polybenzimidazole solid materials more resistant to darkening upon exposure to light. 4,048,139, Cl. 260-45.80N.

Campbell, Richard A.; Sparks, Richard A.; and Perry, Robert W., to United States of America, Army. Apparatus for detecting a stable microwave discrete frequency. 4,048,580, Cl. 331-1.00R.

Canada, Her Majesty the Queen in right of, as represented by the secretary of National Defence: *See—*
McAndless, John Madden, 4,047,505, Cl. 119-106.000.

Canadian Foremost Ltd.: *See—*
Saruwatari, Minoru, 4,047,384, Cl. 60-372.000.

Canadian Patents and Development Limited: *See—*
Mitchell, Earl R.; Brown, Thomas D.; and Post, Beverley C., 4,047,879, Cl. 431-183.000.
Nigrin, Jan, 4,048,583, Cl. 331-56.000.

Canniff, Ronald Jay; and Manfred, Mark Thomas, to Bell Telephone Laboratories, Incorporated. Multiparty telephone ringing. 4,048,448, Cl. 179-17.00E.

Canon Kabushiki Kaisha: *See—*
Sekimura, Nobuyuki, 4,047,805, Cl. 350-166.000.

Canron, Inc.: *See—*
Stewart, John Kenneth; and von Beckmann, Helmuth, 4,048,353, Cl. 427-291.000.

Cantor, Abraham: *See—*
Winicov, Murray A.; and Cantor, Abraham, 4,048,336, Cl. 424-334.000.

Canup, Robert E.; and McPeak, Earl W., Jr., to Texaco Inc. Electrical terminal connector. 4,047,783, Cl. 339-97.00R.

Capaccio, Vincent A.: *See—*
Allis, Robert F.; and Capaccio, Vincent A., 4,047,811, Cl. 355-14.000.

Carba S.A.: *See—*
Gabus, Jean-Claude, 4,048,439, Cl. 178-17.00C.

Carborundum Company, The: *See—*
Colvin, Floyd E.; and Luttrell, John E., 4,048,075, Cl. 210-484.000.

Cardenas, Carlos G., to SCM Corporation. Process for preparation of 1,4-haloallylic esters from dienes. 4,048,220, Cl. 560-237.000.

Carino, John W., to General Electric Company. Insulative header assembly with feed through terminals. 4,047,790, Cl. 339-220.00C.

Carl, Daniel E.: *See—*
Stumbar, James P.; Carl, Daniel E.; and Lee, Suh Y., 4,047,972, Cl. 134-2.000.

Carli, Alvin J.: *See—*
Deming, Andrew F.; and Carli, Alvin J., 4,048,630, Cl. 340-274.00R.

Carlson, Jerome A.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,047,768, Cl. 308-72.000.

Carlsson, David J.; Suprunchuk, Tony; and Wiles, David M. Photostabilization of polymers. 4,048,367, Cl. 428-220.000.

Carlsson, Per Jan Erik: *See—*
Axen, Rolf Erik Axel Verner; Porath, Jerker Olof; and Carlsson, Per Jan Erik, 4,048,416, Cl. 526-9.000.

Carlsson, Rolf Christer, to Telefonaktiebolaget L M Ericsson. Feed-forward amplifier. 4,048,579, Cl. 330-151.000.

Carlstrom, William L.: *See—*
Svoboda, Glenn R.; Suh, John T.; Carlstrom, William L.; and Maechtle, Gary L., 4,048,104, Cl. 260-2.5AN.

Carpano & Pons: *See—*
Bullat, Jean, 4,047,554, Cl. 160-168.00R.

Carrier Corporation: *See—*
Krick, Edward F.; and MacLeod, David E., 4,047,776, Cl. 312-245.000.

Carriera, Manuel. Starter for rope pull outboard motors. 4,047,440, Cl. 74-6.000.

Carson, John Robert, to McNeil Laboratories, Incorporated. Halo-substituted 1-loweralkyl-5-aroylpyrrole-2-acetic acid compounds. 4,048,191, Cl. 260-326.470.

Carson, Lansing M.; and Welter, Neil E., to Motorola Inc. Suppressed carrier automatic gain control circuitry. 4,048,566, Cl. 325-329.000.

Carter, Clyde Thomas, to AMP Incorporated. Low insertion force receptacle and cammed housing. 4,047,791, Cl. 339-260.000.

Carter, William C.: *See—*
Fordyce, Homer E.; and Carter, William C., 4,048,265, Cl. 261-111.000.

Casensky, Bohuslav: *See—*
Kralicek, Jaroslav; Kubanek, Vladimir; Kondelikova, Jaroslava; Casensky, Bohuslav; and Machacek, Jiri, 4,048,421, Cl. 526-177.000.

Casey, Donald James; and Epstein, Martin, to American Cyanamid Company. Normally-solid, bioabsorbable, hydrolyzable, polymeric reaction product. 4,048,256, Cl. 260-860.000.

Castillo, Adolfo: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, 4,047,282, Cl. 29-432.000.

Caterpillar Tractor Co.: *See—*
Belke, William H.; Hafele, Joseph C.; Landen, Ernest W.; and Richards, Thomas J., 4,047,984, Cl. 148-152.000.
Burk, Duane L., 4,047,277, Cl. 29-421.00R.
Earle, Michael, 4,048,459, Cl. 219-85.0BM.
Goloff, Alexander, 4,047,772, Cl. 308-237.00R.
Goloff, Alexander; Barker, Noble G.; and Staebler, Paul J., 4,047,855, Cl. 418-53.000.
Johnson, Lowell E.; Cobb, Raymond P.; Howard, Frank W., III; and Dietz, Dwayne D., 4,047,383, Cl. 60-354.000.
Kranc, Stanley J.; Wells, Alan W.; and Hackett, David E., 4,047,664, Cl. 239-120.000.
May, Czeslaw J.; and Piepho, Donald A., 4,047,542, Cl. 137-627.500.
Meisel, Thomas C., Jr., 4,047,626, Cl. 214-147.00G.
Stary, William Richard; and Shaw, David Merrill, 4,047,572, Cl. 169-62.000.
Stepe, Visvaldis A., 4,047,312, Cl. 37-141.00R.
Vaughn, Kennith E.; and Piper, Hugh V., 4,047,771, Cl. 308-237.00R.
Young, D. Craig; and Zadoks, Abraham L., 4,047,740, Cl. 285-47.000.

Cathey, Jimmy D. Table. 4,047,754, Cl. 297-157.000.

Caumartin, Francois; Raufast, Charles; and Havas, Laszlo, to Naphtachimie. Dry polymerization of olefins in reaction vessels arranged in series. 4,048,412, Cl. 526-65.000.

CCL Systems Limited: *See—*
Edwards, Hugh Jeremy Willis, 4,047,420, Cl. 72-416.000.

Cedrone, Nicholas J. Test contactor system for semiconductor device handling apparatus. 4,047,780, Cl. 339-17.0CF.

Cejka, Joseph B., to Ward Products Corporation. Antenna length indicator. 4,048,638, Cl. 343-894.000.

Celanese Corporation: *See—*
Barer, Sol J., 4,047,925, Cl. 71-78.000.
Breznak, Robert A.; and Parker, James A., 4,048,277, Cl. 264-83.000.
Calundann, Gordon W.; and Powers, Edward J., 4,048,139, Cl. 260-45.80N.
Keith, Charles Herbert, 4,047,862, Cl. 425-8.000.
Vanderspurt, Thomas H., 4,048,110, Cl. 252-443.000.

Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., to Pfizer Inc. Polycyclic ether antibiotic for combating insects. 4,048,304, Cl. 424-122.000.

Celotex Corporation, The: *See—*
Moss, Ernest K., 4,048,145, Cl. 260-57.00R.

Cenek, Miroslav: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.

Centro Sperimentale Metallurgico S.p.A.: *See—*
Barnaba, Pierluigi, 4,048,091, Cl. 252-373.000.

Cernia, Enrico; and Conti, Walter, to Snam Progetti S.P.A. Device for absorbing impact energy. 4,047,702, Cl. 256-13.100.

Chabardes, Pierre; Julia, Marc; and Menet, Albert, to Rhone-Poulenc S.A. Sulphones. 4,048,234, Cl. 260-607.0AR.

Chaintrier, Christian: *See—*
Chaintrier, Guy; and Chaintrier, Christian, 4,047,571, Cl. 169-60.000.

Chaintrier, Guy; and Chaintrier, Christian. Automatic fire extinguishing system for a building having central air conditioning. 4,047,571, Cl. 169-60.000.

Challeton, Didier; Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude. Optical wave guide having distributed gyrotropy. 4,047,801, Cl. 350-96.0WG.

Champagne-Dye Works: *See—*
Dombrowski, Edward J., 4,047,405, Cl. 68-205.00R.

Chandler Evans Inc: *See—*
Sundberg, Jack Gunnar, 4,047,859, Cl. 418-232.000.

Chang, Edward H., to Fremont Industries, Inc. Low temperature metal cleaning composition. 4,048,121, Cl. 252-527.000.

Chang, Yi-Chung, to Berry Metal Company. Process for refining hot metal to steel. 4,047,936, Cl. 75-52.000.

Chappell Industries, Inc.: *See—*
Cleveland, John T.; Chappell, Walter L.; and Watts, John D., 4,047,695, Cl. 251-122.000.

Chappell, Walter L.: *See—*
Cleveland, John T.; Chappell, Walter L.; and Watts, John D., 4,047,695, Cl. 251-122.000.

Charles, Marvin: *See—*
Coughlin, Robert W.; and Charles, Marvin, 4,048,018, Cl. 195-115.000.

Charonnat, Henri Marie Dominique: *See—*
Havard, Jean Francois Pierre Marie; Gaschet, Michel Marceau; and Charonnat, Henri Marie Dominique, 4,048,547, Cl. 318-488.000.

Charransol, Pierre; Hauri, Jacques; and Danis, Roger, to Thomson-CSF. Arrangement for controlling a signal switching system and a method for using this arrangement. 4,048,482, Cl. 235-153.0AE.

Chasar, Dwight William, to B. F. Goodrich Company, The. Light resistant polyolefin compositions. 4,048,140, Cl. 260-45.95C.

Chase-Shawmut Company, The: *See—*
Knapp, Edward J., Jr., 4,048,609, Cl. 337-159.000.

Chattanooga Glass Company: *See—*
Armstrong, Thomas M., 4,047,920, Cl. 65-335.000.

Chatterji, Debajyoti; and Dubin, Robert R., to Electric Power Research Institute, Inc. Na/s cell reactant container with metal aluminide coating. 4,048,390, Cl. 429-102.000.

Chemed Corporation: *See—*
Cuisia, Dionisio Guerrero; and Hwa, Chih Ming, 4,048,066, Cl. 210-58.000.

Chemerda, John M.; and Gal, George, to Merck & Co., Inc. Process for resolving alanine, 3-fluoro and 2-deutero-3-fluoro-DL-alanine. 4,048,224, Cl. 260-534.00C.

Chemical Grout Company, Ltd.: *See—*
Yahiro, Teruo; and Yoshida, Hiroshi, 4,047,580, Cl. 175-67.000.

Chemical Systems, Inc.: *See—*
Kesting, Robert E., 4,048,271, Cl. 264-41.000.

Chemische Werke Huls Aktiengesellschaft: *See—*
Frese, Albert; Dittmann, Walter; and Kilian, Wolfgang, 4,048,419, Cl. 526-153.000.
Haag, Horst; Nordsiek, Karl-Heinz; Streck, Roland; and Zerpner, Dieter, 4,048,262, Cl. 260-889.000.
Ruckelshauss, Gerhard, 4,048,243, Cl. 260-668.00D.

Chemokomplex Vegyipari Gep-es Berendezes Export-Import Vallalat: *See—*
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.

Chen, James Ling; and Battaglia, Jean M., to E. R. Squibb & Sons, Inc. Topical steroid ointment formulations. 4,048,309, Cl. 424-238.000.

Chen, James Ling; and Battaglia, Jean M., to E. R. Squibb & Sons, Inc. Topical steroid formulation in form of lotion or cream. 4,048,310, Cl. 424-238.000.

Chen, Thomas T., to Rockwell International Corporation. Planar magnetoresistance thin film probe for magnetic field alignment. 4,048,557, Cl. 324-46.000.

Cheng, Paul J., to Phillips Petroleum Company. Induced temperature gradient settling vessel. 4,048,063, Cl. 210-72.000.

Cheng, Paul J., to Phillips Petroleum Company. Filtering process and apparatus. 4,048,067, Cl. 210-73.00R.

Chernomordik, Evgeny Naumovich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.

Chevet, Robert, to Saft-Societe des Accumulateurs Fixes et de Traction; and Compagnie Industrielle des Piles Electriques "CIPEL". Cell or battery state of discharge indicator. 4,048,388, Cl. 429-91.000.

Chevron Research Company: *See—*
Lawyer, Leon C., 4,048,612, Cl. 340-15.5CP.
Levine, Irving E., 4,048,343, Cl. 426-330.200.

Cheythey, Arthur W. Dental articulator. 4,047,302, Cl. 32-32.000.

Chicago Bridge & Iron Company: *See—*
Walker, James Donald; and Kline, Leslie F., 4,048,267, Cl. 261-122.000.

Chielens, Alain, to Fives-Cail Babcock. Apparatus for supporting a rotary body of large diameter. 4,047,769, Cl. 308-121.000.

Chierici, Osvaldo F., to Holland Company. Uncoupling device for rotary dump cars. 4,047,619, Cl. 213-166.000.

Childs, Jerry D.; and Love, Roosevelt, to Halliburton Company. Oil well cementing process. 4,047,567, Cl. 166-293.000.

Chillier-Duchatel, Nicole; and Verger, Bernard, to Societe Generale de Constructions Electriques et Mecaniques "Alsthom et Cie". Control system and apparatus for Redox type electrochemical cell. 4,048,384, Cl. 429-22.000.

Chin, Arthur Y.: *See—*
Epstein, James; and Chin, Arthur Y., 4,048,401, Cl. 429-171.000.

Chisum, Finis Lavell. Log product and improvements in machine to prepare logs for log houses. 4,047,350, Cl. 52-593.000.

Chloride Group Limited: *See—*
White, Charles Arthur John, 4,048,400, Cl. 429-160.000.

Chloride Silent Power Limited: *See—*
Tilley, Alec R.; and Hames, Michael D., 4,048,391, Cl. 429-104.000.

Chronberg, Sten, to Agence Nationale de Valorisation de la Recherche (ANVAR). Method and machine for manufacturing a plate-like material made from agglomerated particles and in particular ceramic products obtained thereby. 4,048,037, Cl. 204-180.00R.

Chrysler France: *See—*
Lecart, Jean-Guy Pierre Denis; and Amalberti, Jean Claude, 4,047,450, Cl. 74-552.000.

Chu, Joseph Y. C.; and Gunther, Wolfgang H. H., to Xerox Corporation. Process for preparation of transparencies by selective decomposition of an organoselenium compound in a polymeric matrix. 4,047,947, Cl. 96-1.300.

Chuang, Ping-chien; and Plunkett, Joseph A., to Recognition Equipment Incorporated. Automated character recognition system. 4,048,615, Cl. 340-146.3AC.

Chuo Hatsujo Kogyo Co., Ltd.: *See—*
Takeuchi, Kazuaki, 4,047,683, Cl. 248-62.000.

Ciarniello, Giorgio; and De Lena, Oscar, to Societa Italiana Vetro Siv S.p.A. Automatic control system for a defogging circuit. 4,048,469, Cl. 219-203.000.

Ciba-Geigy Corporation: *See—*
Guglielmetti, Leonardo, 4,048,212, Cl. 260-465.00H.
Karrer, Friedrich, 4,048,235, Cl. 260-612.00R.
Karrer, Friedrich, 4,048,327, Cl. 424-305.000.
Porret, Daniel; and Habermeier, Jurgen, 4,048,170, Cl. 260-256.40E.
Rohr, Otto, 4,047,931, Cl. 71-107.000.
Rohr, Otto, 4,048,217, Cl. 560-20.000.
Shen, Kwan Ting; Gannon, John Allister; and Nelson, Robert Charles, 4,048,179, Cl. 260-29.40R.

Cieplik, Robert J.; and Czarnecki, Victor, to Addressograph Multigraph Corporation. Mechanism to open and close iris on lens. 4,048,641, Cl. 354-10.000.

cikalon-Vliesstoff-werke GmbH: *See—*
Lochner, Herbert, 4,047,269, Cl. 28-109.000.

Cities Service Company: *See—*
Greene, Marvin, 4,048,053, Cl. 208-8.000.

Citizen Watch Company Limited: *See—*
Nakajima, Fumio; Machida, Takayasu; and Yamada, Kenji, 4,048,548, Cl. 318-138.000.

Clampitt, Richard L.; and Hessert, James E., to Phillips Petroleum Company. Aqueous gels and uses thereof. 4,048,079, Cl. 252-8.55D.

Clark, George W.; and Dainty, Douglas H., to AMAX Inc. Thermite smelting of ferromolybdenum. 4,047,942, Cl. 75-133.500.

Clark, Ian Sidney Rex: *See—*
Larson, Jay Michael; Clark, Ian Sidney Rex; and Gibson, Robert Cameron, 4,047,933, Cl. 75-.50C.

Clark, William T., III. Biocompatible hemoperfusion system. 4,048,064, Cl. 210-23.00R.

Clarke, Graham Morley; and Fisher, George, to Ferranti Limited. Circuit arrangements for controlling detector signals in surface inspection systems. 4,048,510, Cl. 250-563.000.

Clarke, Graham Wilson: *See—*
Lister, Edward Alan; and Clarke, Graham Wilson, 4,047,362, Cl. 53-189.000.

Clay, Warren C., to Thermo Electron Corporation. Pneumatic pulsator pumping system with pulsator fluid venting valve. 4,047,849, Cl. 417-384.000.

Clayton, John Peter; and Bentley, Peter Hubert, to Beecham Group Limited. Penicillins. 4,048,320, Cl. 424-271.000.

Clearwater Systems Inc.: *See—*
Moeglich, Karl, 4,048,028, Cl. 204-97.000.

Clem, Arthur G., to American Colloid Company. Water barrier panel. 4,048,373, Cl. 428-454.000.

Cleveland, John T.; Chappell, Walter L.; and Watts, John D., to Chappell Industries, Inc. Adjustable choke. 4,047,695, Cl. 251-122.000.

Clifford, John E., to Battelle Memorial Institute. Combination cell. 4,048,383, Cl. 429-19.000.

Close, Leo R., to Israel, Mrs. Lawrence. Mechanism for releasing device attaching an anti-theft monitor to merchandise. 4,047,410, Cl. 70-401.000.

Clowes, John Roger: *See—*
Bamford, Kenneth; and Clowes, John Roger, 4,047,762, Cl. 299-64.000.

Cobb, Raymond L., to Phillips Petroleum Company. Isomerization of the cis, trans isomers of 1,2,5,6-tetrasubstituted-1,5-cyclooctadienes to the corresponding cis, cis-isomers. 4,048,209, Cl. 260-464.000.

Cobb, Raymond P.: *See—*
Johnson, Lowell E.; Cobb, Raymond P.; Howard, Frank W., III; and Dietz, Dwayne D., 4,047,383, Cl. 60-354.000.

Cochran, Michael J.; and Grant, Charles P., Jr., to Texas Instruments Incorporated. Calculator system having multi-function memory instruction register. 4,048,624, Cl. 364-200.000.

Coe, Noel N.: *See—*
Saeman, Walter C.; and Coe, Noel N., 4,048,351, Cl. 427-213.000.

Coen Company, Inc.: *See—*
Voorheis, Temple S.; and White, James H., 4,047,489, Cl. 110-15.000.

Coeure, Philippe: *See—*
Challeton, Didier; Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,047,801, Cl. 350-96.0WG.

Cogan, Frederick Thomas: *See—*
Gumb, Beverly William; Kuhfus, Gerd; and Cogan, Frederick Thomas, 4,047,787, Cl. 339-154.00A.

Cohen-Alloro, Richard: *See—*
Cuvillier, Roger; and Cohen-Alloro, Richard, 4,048,069, Cl. 210-84.000.

Cohen, Joseph David: *See—*
Brookes, Neil Roger; Ray, Martin George; Cohen, Joseph David; and McCarey, Thomas Joseph, 4,047,379, Cl. 60-39.09D.

Coldren, Chester P., to Eaton Corporation. Tension indicator. 4,047,463, Cl. 85-62.000.
Cole, Edward L.; Hess, Howard V.; and Wong, James, Jr., to Texaco Inc. Upgrading of solid fuels. 4,047,898, Cl. 44-1.00G.
Cole, Lewis C., to United States of America, Army. Fuze with bimetallic spring delay module. 4,047,484, Cl. 102-76.00P.
Colella, Donald F.; and Kaiser, Carl, to SmithKline Corporation. α-aminomethyl-4-hydroxy-3-methylsulfonyl benzyl alcohols. 4,048,229, Cl. 260-570.600.
Coleman, William R.; and Duffey, Thomas E., to Riviana Foods Inc. Aqueous pesticidal solutions containing polyethylene glycol. 4,048,302, Cl. 424-78.000.
Colgate-Palmolive Company: *See*—
Douglass, Miriam Lois, 4,048,181, Cl. 260-294.80G.
Gerecht, John Fred, 4,048,338, Cl. 424-358.000.
Karami, Hamzeh, 4,047,528, Cl. 128-287.000.
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Karami, Hamzeh, 4,047,531, Cl. 128-290.00R.
Tomlinson, Kenneth; and Duff, Edward John, 4,048,300, Cl. 424-52.000.
Collins, Russell Bancroft: *See*—
Crane, Warren Joseph; Collins, Russell Bancroft; and Crane, Charles Warren, 4,047,415, Cl. 72-125.000.
Colonial Metals, Inc.: *See*—
Davies, Ronald F.; and Benvegno, George J., 4,048,092, Cl. 252-412.000.
Colvin, Floyd E.; and Luttrell, John E., to Carborundum Company, The. Filter cartridge. 4,048,075, Cl. 210-484.000.
Combustion Engineering, Inc.: *See*—
Schuetz, Adolph August, 4,047,891, Cl. 23-230.00A.
Commissariat a l'Energie Atomique: *See*—
Barbier, Daniel; Ittel, Jean-Michel; and Poujois, Robert, 4,048,574, Cl. 330-9.000.
Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, 4,047,436, Cl. 73-362.0SC.
Berthelot, Guy, 4,047,850, Cl. 417-383.000.
Heyraud, Jacques, 4,047,886, Cl. 432-128.000.
Commonwealth Scientific and Industrial Research Organization: *See*—
Waters, Percy Lloyd, 4,047,883, Cl. 432-14.000.
Compagnie Industrielle des Piles Electriques "CIPEL": *See*—
Chevet, Robert, 4,048,388, Cl. 429-91.000.
Compair Industrial Limited: *See*—
Poole, Eric John, 4,047,848, Cl. 417-374.000.
Comstock & Wescott, Inc.: *See*—
Rice, Richard E., 4,047,876, Cl. 431-7.000.
Condea Chemie GmbH: *See*—
Wassermann, Martin; and Meyer, Arnold, 4,048,295, Cl. 423-626.000.
Condon, Michael E.: *See*—
Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., 4,048,231, Cl. 260-570.700.
Conklin, Robert M.; and Human, Arthur T., to Holmes Protection Inc. Coding system for an alarm system and the like. 4,048,621, Cl. 340-168.00B.
Connelly, Robert Frederick. Method of oxidizing or bleaching a contaminant in a non-aqueous fluid. 4,048,240, Cl. 260-652.00P.
Consolidated Freightways, Inc.: *See*—
Markland, R. Donald, 4,047,912, Cl. 55-406.000.
Consupak, Inc.: *See*—
Farrell, John Jerome, 4,047,873, Cl. 425-523.000.
Container Corporation of America: *See*—
Bell, Richard L.; Desmond, John D.; and Hart, Joseph J., 4,047,660, Cl. 206-620.000.
Container Graphics Corporation: *See*—
Saunders, Philip G., 4,047,481, Cl. 101-376.000.
Contemporary, Inc.: *See*—
Kanzelberger, James C., 4,047,996, Cl. 156-220.000.
Conti, Walter: *See*—
Cernia, Enrico; and Conti, Walter, 4,047,702, Cl. 256-13.100.
Cook, Edward H., Jr.: *See*—
Eng, Jeffrey D.; Cook, Edward H., Jr.; and Figueras, Wilfredo E., 4,048,045, Cl. 204-263.000.
Cooper, David J.; Hoover, John R. E.; and Weisbach, Jerry A., to SmithKline Corporation. Mercaptopseudotrisaccharides. 4,048,430, Cl. 536-17.000.
Cooper, Robin D. G.; and Spry, Douglas O., to Eli Lilly and Company. 4(Formylthio)-azetidin-2-ones and ozonization process therefor. 4,048,157, Cl. 260-239.00A.
Cooper, Shannon L.; and Adams, Frank C., to Hart Schaffner & Marx. Marker making methods for cutting fabric patterns. 4,047,951, Cl. 96-27.00R.
Copeland Concrete Products, Inc.: *See*—
Copeland, William Leo, 4,047,962, Cl. 106-90.000.
Copeland, William Leo, to Copeland Concrete Products, Inc. Construction composition. 4,047,962, Cl. 106-90.000.
Copperloy Corporation: *See*—
Miles, Ray P., 4,047,734, Cl. 280-486.000.
Coppola, Richard M.: *See*—
Schrank, Martin P.; and Coppola, Richard M., 4,048,347, Cl. 427-10.000.
Corderman, Sidney A.: *See*—
Evans, Ronald C.; and Corderman, Sidney A., 4,048,573, Cl. 330-2.000.
Cornell, Martin C., III: *See*—
Doorakian, George A.; Schmidt, Dennis L.; and Cornell, Martin C., III, 4,048,141, Cl. 260-47.0EC.
Corning Glass Works: *See*—
Bihuniak, Peter P.; and Guile, Donald L., 4,047,966, Cl. 106-69.000.
Reade, Richard F., 4,047,960, Cl. 106-39.800.
Corporation of Gonzaga University, The: *See*—
Kelleher, Raymond L.; Shirk, Ivan A.; and O'Leary, Timothy J., deceased, 4,048,287, Cl. 423-242.000.
Cotterrell, Graham Paul, to Imperial Chemical Industries Limited. Carbonylmethylpyrimidin-6-yl phosphates and phosphorothionates. 4,048,172, Cl. 260-256.50R.
Coughlin, Robert W.; and Charles, Marvin. Method of carrying out enzyme catalyzed reactions. 4,048,018, Cl. 195-115.000.
Counsell, Raymond E.; and Yu, Terry Ta-Jen, to University of Michigan, The Regents of the. Novel quaternary ammonium salts, compositions and methods for their use. 4,048,297, Cl. 424-1.000.
Coupe, Edward Gordon, to Dosco Overseas Engineering Limited. Mining machine. 4,047,761, Cl. 299-64.000.
Courtenay, John Henry; and Wardell, Martin Bernard Peter, to Foseco Trading A.G. Refractory heat-insulating materials. 4,048,134, Cl. 260-38.000.
Cox, Howard W., to Mission Marketing Corporation of Arizona. Ventilating damper assembly. 4,047,475, Cl. 98-116.000.
Cox Instrument Division Lynch Corporation: *See*—
Dabanian, Karnig H., 4,047,433, Cl. 73-194.00C.
Cox, John T.; Garber, Michael B.; Jasper, Marilyn A.; and LoVecchio, Paul, to United States of America, Army. Lead-tin-telluride photodetector array. 4,048,535, Cl. 313-367.000.
CPC International Inc.: *See*—
Gibbons, John P.; and Wondolowski, Lawrence, 4,048,126, Cl. 260-17.200.
Gibbons, John P.; and Wondolowski, Lawrence, 4,048,127, Cl. 260-17.200.
Crafts, Harold Springer: *See*—
Hendrie, Gardner Cox; and Crafts, Harold Springer, 4,048,673, Cl. 364-200.000.
Cragar, Darryl E.: *See*—
Boozalis, Theodore S.; Cragar, Darryl E.; Ivy, John B.; and Willis, Gordon G., 4,048,241, Cl. 260-658.00R.
Craighead, Bobby L.: *See*—
Pearre, Stephen G.; and Craighead, Bobby L., 4,048,076, Cl. 210-528.000.
Crandall, Richard E.; and Morgan, Denny E., to Kinney Safety Systems, Inc. Central station to addressed point communication system. 4,048,620, Cl. 340-163.000.
Crane, Charles Warren: *See*—
Crane, Warren Joseph; Collins, Russell Bancroft; and Crane, Charles Warren, 4,047,415, Cl. 72-125.000.
Crane, Warren Joseph; Collins, Russell Bancroft; and Crane, Charles Warren. Apparatus for shaping the end of a hollow tube. 4,047,415, Cl. 72-125.000.
Crankshaw, John H., to Dynetics, Inc. Synchronizing coupling. 4,047,602, Cl. 192-53.00F.
Crickmer, Charles D., to Otis Engineering Corporation. Well tool. 4,047,565, Cl. 166-217.000.
Crist, Eugene A.: *See*—
Kehl, Donald K.; and Crist, Eugene A., 4,047,328, Cl. 47-59.000.
Crochiere, Ronald Eldon; Flanagan, James Loton; and Webber, Susan Anne, to Bell Telephone Laboratories, Incorporated. Digital speech communication system for minimizing quantizing noise. 4,048,443, Cl. 179-1.0SA.
Croft, George Thomas, to Addressograph Multigraph Corporation. Duplicating process utilizing ion modulating means as the image generating source. 4,047,946, Cl. 96-1.00R.
Cross, Frances: *See*—
Cross, Howard, 4,047,799, Cl. 350-97.000.
Cross, Howard, to Cross, Frances. Multi-color hand signal. 4,047,799, Cl. 350-97.000.
Crossley, Roger: *See*—
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,048,175, Cl. 260-283.00S.
Crouse, Jere W.: *See*—
Dahl, Carl B.; and Crouse, Jere W., 4,047,676, Cl. 242-66.000.
Crowder, Charles H.: *See*—
Hale, Ferrell Daniel; and Crowder, Charles H., 4,048,368, Cl. 428-235.000.
Crown Cork & Seal Company, Inc.: *See*—
Wright, George W., 4,047,613, Cl. 209-74.00M.
Croyle, Jack V., to Dart Industries Inc. Spout with snap acting cover and drain hole. 4,047,648, Cl. 222-498.000.
Csaki, Julius A., to Hewlett-Packard Company. Apparatus for converting CRT cathodes. 4,047,778, Cl. 316-18.000.
CSELT - Centro Studi e Laboratori Telecommunicazioni S.p.A.: *See*—
Dogliotti, Renato; Mazzei, Umberto; and Mengali, Umberto, 4,048,572, Cl. 329-104.000.
Cuisia, Dionisio Guerrero; and Hwa, Chih Ming, to Chemed Corporation. Method of inhibiting scale. 4,048,066, Cl. 210-58.000.
Cullen, Walter P.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,048,304, Cl. 424-122.000.
Culver, Irven H.; and Szymber, Oleg, to Belrico, Inc. Dual rate bias spring for antibacklashing gears. 4,047,447, Cl. 74-409.000.
Cummings, Robert E.: *See*—
Johns, Eddie D.; Cummings, Robert E.; and Pearl, Edgar W., 4,047,408, Cl. 70-129.000.

Cunningham, Van Buren, II: *See—*
Duncan, William Palmer, 4,047,319, Cl. 43-44.870.
Curcio, Joseph John, to Paoli High Fidelity Consultants Inc. Electronic filter with active elements. 4,048,523, Cl. 307-297.000.
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, to John Wyeth & Brother Limited. Tetrahydroquinoline derivatives. 4,048,175, Cl. 260-283.00S.
Curtiss-Wright Corporation: *See—*
Avena, Salvatore; and Minarick, Joseph W., 4,047,842, Cl. 416-152.000.
Cuvillier, Roger; and Cohen-Alloro, Richard, to Bureau de Recherches Geologiques et Minieres. Small surface liquid decantation apparatus and process for making same. 4,048,069, Cl. 210-84.000.
Czarnecki, Victor: *See—*
Cieplik, Robert J.; and Czarnecki, Victor, 4,048,641, Cl. 354-10.000.
Czerny, Thomas: *See—*
Sauer, Hans; and Czerny, Thomas, 4,048,472, Cl. 219-388.000.
Czombos, Jozsef: *See—*
Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.
Dabanian, Karnig H., to Cox Instrument Division Lynch Corporation. Modular vortex flowmeter. 4,047,433, Cl. 73-194.00C.
Dahl, Carl B.; and Crouse, Jere W., to Beloit Corporation. Winder vibration dampener. 4,047,676, Cl. 242-66.000.
Dai Nippon Toryo Kabushiki Kaisha: *See—*
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 4,047,803, Cl. 350-160.0LC.
Yaguchi, Mashachika; and Nakamura, Kenji, 4,048,088, Cl. 252-299.000.
Daicel Ltd.: *See—*
Nakamachi, Akio; and Maruo, Zenichi, 4,048,101, Cl. 260-2.50E.
Daidotokushuko-Kabushikikaisha: *See—*
Hiratake, Susumu; and Matsui, Mitsuhiro, 4,048,436, Cl. 13-2.00P.
Dainippon Ink & Chemicals, Inc.: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,059, Cl. 252-299.000.
Dainty, Douglas H.: *See—*
Clark, George W.; and Dainty, Douglas H., 4,047,942, Cl. 75-133.500.
Dale, C. Harold, Jr.; Howe, Spencer D.; Bonebreak, Robert L.; and Starkus, Charles J., to Hughes Aircraft Company. Torque while turn-around scan mirror assembly. 4,047,792, Cl. 350-6.000.
Dalton, Raymond Frederick: *See—*
Anderson, Brian; Dalton, Raymond Frederick; and Rowbotham, Philip Martin, 4,048,187, Cl. 260-308.00D.
Daly, Richard T. Bee-hive scale. 4,047,584, Cl. 177-1.000.
Dammeyer, Bruce, to Teco, Inc. Actuating system for transportable articulated booms having raisable platforms. 4,047,593, Cl. 182-2.000.
Dampocrete Incorporated: *See—*
Majidzadeh, Kamran; and Guirguis, Hani R., 4,047,967, Cl. 106-90.000.
Damratowski, Harold E., to Triad Fastner Corporation. Air-powered, self-feeding screw driving tool. 4,047,611, Cl. 206-347.000.
Daniel, Walter Lee. Wood burning furnace. 4,047,515, Cl. 126-110.00R.
Daniels, Roger D.; and Snover, John A., to Dow Chemical Company, The. Crystallizing solution and method of preparation thereof. 4,048,087, Cl. 252-188.000.
Danis, Roger: *See—*
Charransol, Pierre; Hauri, Jacques; and Danis, Roger, 4,048,482, Cl. 235-153.0AE.
Danova, Verginia Ilieva: *See—*
Nenov, Dimiter Panayotov; and Danova, Verginia Ilieva, 4,048,025, Cl. 204-56.00R.
Dansk Styreteknik A/S: *See—*
Trostmann, Erik; and Albertsen, Ove, 4,047,478, Cl. 99-450.100.
Daoust, Ralph R.; and Daoust, Timothy N., to Front Discharge Mixer, Inc. Apparatus for controlling the flow of concrete from a mixer. 4,047,604, Cl. 193-10.000.
Daoust, Timothy N.: *See—*
Daoust, Ralph R.; and Daoust, Timothy N., 4,047,604, Cl. 193-10.000.
Darby, Paul L.: *See—*
Weill, Paul B.; and Darby, Paul L., 4,047,988, Cl. 149-74.000.
Darmstadt, Robert M. Pneumatic load-supporting structures. 4,047,335, Cl. 52-2.000.
Dart Industries Inc.: *See—*
Croyle, Jack V., 4,047,648, Cl. 222-498.000.
Trombly, Edgar F., 4,047,633, Cl. 220-9.00R.
Data General Corporation: *See—*
Gruner, Ronald H., 4,048,623, Cl. 364-900.000.
Hendrie, Gardner Cox; and Crafts, Harold Springer, 4,048,673, Cl. 364-200.000.
Daugherty, Kenneth Earl: *See—*
Alderete, William Eugene; Boyer, John Parke; Daugherty, Kenneth Earl; and Johnson, David Lee, 4,047,961, Cl. 106-89.000.
David, Donald J.; and Tucker, Huel C., to United States of America, Army. Electronic system for providing specificity in an electrochemical analytical device. 4,048,041, Cl. 204-195.00R.
Davies, Ronald F.; and Benvegno, George J., to Colonial Metals, Inc. Catalytic mixture and method of use therefor. 4,048,092, Cl. 252-412.000.
Davis, Royston H., to Shell Oil Company. Transcyanohydrination. 4,048,210, Cl. 260-465.00F.
Davlantes, George N. Pet access door panel. 4,047,331, Cl. 49-171.000.
Dawson, Kenneth Harold: *See—*
Seaborn, Paul Edward; and Dawson, Kenneth Harold, 4,047,544, Cl. 140-105.000.
Daxinger, Helmut, to Balzers Patent und Beteiligungs-AG. Method of producing a light transmitting absorbing coating on substrates. 4,048,039, Cl. 204-192.00P.
Day, James L.: *See—*
Whaley, Robert L.; and Day, James L., 4,047,748, Cl. 296-35.00A.
Dayco Corporation: *See—*
Speer, Billy L., 4,047,446, Cl. 74-234.000.
DeAngelis, Gloria J., to Raymond Lee Organization, Inc., The, a part interest. Volley tennis game. 4,047,717, Cl. 273-95.00H.
Decker, Bert J. Horizontal windmill. 4,047,833, Cl. 415-2.000.
Decroix, Paul Marcel Edmond, to Societe d'Equipements Divers Pour la Population Civile et l'Aviation Sedpa. Triangular-wing glider. 4,047,679, Cl. 244-16.000.
Dedova, Petrushka Atanassova: *See—*
Kondratenko, Maria Stefanova; Nachev, Lyubomir Todorov; Dedova, Petrushka Atanassova; and Antonova, Tamara Nikolaevna, 4,048,339, Cl. 426-39.000.
Deere & Company: *See—*
Anstey, Henry Dennis, 4,047,587, Cl. 180-53.00R.
Roach, Maurice P.; and Strudthoff, Stanley L., 4,048,556, Cl. 324-40.000.
de Gaston, Alexis Neal. X-ray beam perpendicular finder. 4,048,507, Cl. 250-491.000.
Deijs, Phillip: *See—*
Hookings, Paul H.; Wade, Harry C.; and Deijs, Phillip, 4,047,419, Cl. 72-370.000.
Deininger, Warren L. Pill and capsule counter. 4,047,620, Cl. 214-1.00C.
Delalande S.A.: *See—*
Fauran, Claude P.; Raynaud, Guy M.; Turin, Michel J.; and Thomas, Janine M., 4,048,164, Cl. 544-121.000.
Delaney, Francis Alfred, to Sinanan Enterprises Limited. Liquid dispensing containers with cutter for preventing refilling. 4,047,641, Cl. 222-80.000.
De Lena, Oscar: *See—*
Ciarniello, Giorgio; and De Lena, Oscar, 4,048,469, Cl. 219-203.000.
Delmar Chemicals Limited: *See—*
Kubela, Rudolph; and Do Nascimento, Jose Maria, 4,048,314, Cl. 424-248.550.
Delre, Anthony, Jr. Drafting board with adjustable straight-edge assembly. 4,047,304, Cl. 33-80.000.
Deming, Andrew F.; and Carli, Alvin J., to Alliance Manufacturing Co., Inc., The. Door operator with automatic control of auxiliary circuit. 4,048,630, Cl. 340-274.00R.
DeNigris, Ernest Gerard; and Palette, Ralph John, to Bell Telephone Laboratories, Incorporated. Printed wiring board handle having viewable option connectors. 4,047,781, Cl. 339-17.00R.
Dennison, James Clifford; and Ottesen, Hjalmar Holmboe, to International Business Machines Corporation. Record track following and seeking. 4,048,660, Cl. 360-77.000.
Dennison Manufacturing Company: *See—*
Paradis, Joseph R., 4,047,545, Cl. 140-123.600.
Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Derivatives of imidazo [4,5-b]pyridines. 4,048,182, Cl. 260-295.50B.
DePirro, Mario Louis. Post footing form holder and stabilizer system. 4,047,356, Cl. 52-749.000.
Derner, Paul; Sonntag, Hans; and Stehl, Otto, to BFG Glassgroup. Light transmitting panel. 4,047,351, Cl. 52-616.000.
deRosset, Armand J.: *See—*
Neuzil, Richard W.; and deRosset, Armand J., 4,048,205, Cl. 260-428.000.
de Ruggieri, Pietro; and Sighinolfi, Orazio, to Farmila Farmaceutici. Tetrahydropyranyl ethers of estrogens. 4,048,159, Cl. 260-239.55R.
DeSantis, Raymond P., to Wolverine Aluminum Corporation. Apparatus for producing spherical articles. 4,047,864, Cl. 425-78.000.
Deschamps, Andre: *See—*
Renault, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Dezael, Claude, 4,048,293, Cl. 423-574.00L.
Designeers Midwest: *See—*
Albers, Norbert C., 4,047,276, Cl. 29-222.000.
Deslandes, Claude: *See—*
Kervizic, Jean; Deslandes, Claude; and Berson, Alain, 4,047,482, Cl. 102-19.200.
Desmond, John D.: *See—*
Bell, Richard L.; Desmond, John D.; and Hart, Joseph J., 4,047,660, Cl. 206-620.000.
Deuterium Corporation: *See—*
Spevack, Jerome S., 4,047,905, Cl. 55-37.000.
Deutsch, Bennett; and Deutsch, Maria E. Mop and dusting device. 4,047,260, Cl. 15-147.00A.
Deutsch, Maria E.: *See—*
Deutsch, Bennett; and Deutsch, Maria E., 4,047,260, Cl. 15-147.00A.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Koberstein, Edgar; and Lakatos, Eduard, 4,048,098, Cl. 252-432.000.
Koberstein, Edgar; Muller, Klaus; and Theissen, Ferdinand, 4,048,232, Cl. 260-601.00R.
Prescher, Gunter; and Schreyer, Gerd, 4,048,225, Cl. 260-536.000.

Deutsche Texaco Aktiengesellschaft: *See*—
Wegner, Hans-Georg; and Kunert, Maximilian, 4,048,055, Cl. 208-25.000.
DeWeese, Harry R.; and Smith, Gary L. Water hydrant diffuser. 4,047,668, Cl. 239-500.000.
De Winter, Walter Frans; and Timmerman, Daniel Maurice, to AGFA-GEVAERT N.V. Process of hardening protein-containing photographic layers with a mixture of a carboxyl group-activating, low molecular weight compound and a carboxyl group-activating polymer. 4,047,957, Cl. 96-67.000.
Dezael, Claude: *See*—
Renault, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Dezael, Claude, 4,048,293, Cl. 423-574.00L.
Diamantides, Nick D. Universal impedance power apparatus. 4,048,602, Cl. 335-222.000.
Dianetti, Joseph C.: *See*—
Park, Ernest D.; and Dianetti, Joseph C., 4,047,794, Cl. 350-54.000.
Diax Corporation: *See*—
Kreuzer, Lloyd B., 4,048,499, Cl. 250-344.000.
DiBease, Paul J., to Raymond Lee Organization, Inc., The, a part interest. Bicycle reflector device. 4,047,800, Cl. 350-99.000.
Dickey-john Corporation: *See*—
Marsh, Norman F.; and Eng, William T., 4,047,434, Cl. 73-304.00R.
Dickinson, Timothy E.: *See*—
Phillips, Jack L.; and Dickinson, Timothy E., 4,047,532, Cl. 128-303.00R.
Dieringer, Andrew M.; and Sheperd, Ervin M., to Rexnord Inc. Method for removing ties under railroad track. 4,047,280, Cl. 29-427.000.
Dietrich, Bernhard, to Schaltbau Gesellschaft MBH. Contact system for relays, particularly power relays. 4,048,600, Cl. 335-128.000.
Dietz, Dwayne D.: *See*—
Johnson, Lowell E.; Cobb, Raymond P.; Howard, Frank W., III; and Dietz, Dwayne D., 4,047,383, Cl. 60-354.000.
Digital Data Inc.: *See*—
Forman, Aubry S., Jr.; Schultz, Charles A., Jr.; and Vice, William E., 4,048,619, Cl. 340-154.000.
Di Maio, Anthony E.; and Todisco, Joseph G., to Marson Corporation. Method of setting blind rivets. 4,047,281, Cl. 29-429.000.
Dimcheva, Zlatka Petkova: *See*—
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
DiMurro, Richard J.: *See*—
Bick, Maurice; and DiMurro, Richard J., 4,048,043, Cl. 204-224.00R.
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, to Bor-, Cipo-, Szormeipari Kutato Intezet; and Vseojuzny Nauchno-Issledovatelsky Institut Plenochnykh Materialov I Iskusstvennoi Kozhi. Press mold for producing microcellular shaped pieces of dimensional accuracy, particularly shoe soles. 4,047,860, Cl. 425-4.00R.
Director-General of the Agency of Industrial Science and Technology: *See*—
Kusakabe, Masao; Fuziwara, Shuzo; and Shiino, Kazuo, 4,047,987, Cl. 149-37.000.
Dittmann, Walter: *See*—
Frese, Albert; Dittmann, Walter; and Kilian, Wolfgang, 4,048,419, Cl. 526-153.000.
Diz, Angel. Sugarcane planting device. 4,047,631, Cl. 214-519.000.
Dlugos, Daniel F., to Pitney-Bowes, Inc. Scale optical detector with spring constant variation compensator. 4,047,585, Cl. 177-210.00R.
Dlugos, Daniel F., to Pitney-Bowes, Inc. Zero load adjustment apparatus for spring weighing scale. 4,047,586, Cl. 177-210.00R.
Do Nascimento, Jose Maria: *See*—
Kubela, Rudolph; and Do Nascimento, Jose Maria, 4,048,314, Cl. 424-248.550.
Dobberpuhl, Daniel W., to General Electric Company. Integrated crystal oscillator circuit with few external components. 4,048,590, Cl. 331-116.00R.
Dr. L. Zambeletti S.p.A.: *See*—
Molteni, Luigi; Vercesi, Gian Piero; and Antonini, Eraldo, 4,048,305, Cl. 424-177.000.
Dodswoth, Edward: *See*—
McGeehin, Robert; and Dodswoth, Edward, 4,047,634, Cl. 220-270.000.
Dogliotti, Renato; Mazzei, Umberto; and Mengali, Umberto, to CSELT - Centro Studi e Laboratori Telecommunicazioni S.p.A. Adaptive correction of phase errors in noncoherent demodulation of carrier asymmetrically modulated with digital signals. 4,048,572, Cl. 329-104.000.
Dombrowski, Edward J., to Champagne-Dye Works. Apparatus for applying dye liquor to knit/deknit tubular rolls. 4,047,405, Cl. 68-205.00R.
Domingos, John M. Sportsman's multipurpose utility pouch. 4,047,650, Cl. 224-2.00B.
Donald, Robert C., Jr.: *See*—
Ward, Phillip W.; Donald, Robert C., Jr.; and Leerskov, Arthur E., Jr., 4,047,591, Cl. 181-119.000.
Donath, Jeno: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.
Doorakian, George A.; Schmidt, Dennis L.; and Cornell, Martin C., III, to Dow Chemical Company, The. Latent catalysts for promoting reaction of epoxides with phenols and/or carboxylic acids. 4,048,141, Cl. 260-47.0EC.
Dorenbos, Frederick William, to Airco, Inc. Workpiece handling system for vacuum processing. 4,047,624, Cl. 214-17.00B.
Dorn, Peter; and Foucher, Walter D., Jr., to Texaco Inc. Motor fuel composition. 4,047,900, Cl. 44-68.000.
Dornier GmbH: *See*—
Krojer, Hubert, 4,047,911, Cl. 55-306.000.
Dosco Overseas Engineering Limited: *See*—
Bamford, Kenneth; and Clowes, John Roger, 4,047,762, Cl. 299-64.000.
Coupe, Edward Gordon, 4,047,761, Cl. 299-64.000.
Douglas, Walter M., to UOP Inc. Sulfonated metal phthalocyanine catalyst. 4,048,097, Cl. 252-431.00N.
Douglass, Miriam Lois, to Colgate-Palmolive Company. Derivatives of mercaptopyridine-1-oxide. 4,048,181, Cl. 260-294.80G.
Douthett, Joseph A.: *See*—
Arnold, Jerry L.; and Douthett, Joseph A., 4,047,981, Cl. 148-16.000.
Dow Chemical Company, The: *See*—
Boozalis, Theodore S.; Cragar, Darryl E.; Ivy, John B.; and Willis, Gordon G., 4,048,241, Cl. 260-658.00R.
Daniels, Roger D.; and Snover, John A., 4,048,087, Cl. 252-188.000.
Doorakian, George A.; Schmidt, Dennis L.; and Cornell, Martin C., III, 4,048,141, Cl. 260-47.0EC.
Gurgiolo, Arthur E.; and Booth, Llewellyn D., 4,048,100, Cl. 260-2.5AJ.
Lee, John Malcolm, 4,048,283, Cl. 423-92.000.
McMaster, Elmer L.; Grenley, Dallas G.; and Prueter, Elton D., 4,048,000, Cl. 156-304.000.
Mixan, Craig E.; and Pews, R. Garth, 4,048,213, Cl. 260-465.00F.
Paul, Albertha M.; and Moppett, Charles E., 4,048,166, Cl. 544-215.000.
Paul, Albertha M.; and Moppett, Charles E., 4,048,167, Cl. 544-215.000.
Quock, Billy; Kelley, Don Howard; and Warneke, Sehon Lester, 4,048,102, Cl. 260-2.5AM.
Shah, Dhiren N., 4,047,866, Cl. 425-107.000.
Sinke, Gerard C.; Langhorst, Martin A.; and May, James A., Sr., 4,048,288, Cl. 423-267.000.
Valle-Riestra, J. Frank, 4,048,007, Cl. 162-57.000.
Wolfe, David L.; and Sexton, Arthur R., 4,048,237, Cl. 260-615.00B.
Downs Surgical Limited: *See*—
Hall, John Emmett, 4,047,523, Cl. 128-69.000.
Hall, John Emmett, 4,047,524, Cl. 128-69.000.
Doya, Masaharu: *See*—
Yoshinaka, Shigeo; Uchiyama, Seiji; and Doya, Masaharu, 4,048,033, Cl. 204-158.0HA.
Draber, Wilfried: *See*—
Schmidt, Robert R.; Eue, Ludwig; and Draber, Wilfried, 4,047,929, Cl. 71-93.000.
Drabowitch, Serge, to Thomson-CSF. Arrangement for extracting divergence-measuring modes from a corrugated guide and tracking antenna incorporating same. 4,048,592, Cl. 333-6.000.
Drayrer, Colin James: *See*—
George, Brian Victor; and Drayrer, Colin James, 4,048,012, Cl. 176-60.000.
Dresser Industries, Inc.: *See*—
Angehrn, Jorg August, 4,047,430, Cl. 73-151.000.
Dyer, Norman Dean, 4,047,583, Cl. 175-410.000.
Drico Industrial Corporation: *See*—
Hansen, Elwood F.; Goldberg, Arnold; Zenzie, Henry; and Giroward, Kermit, 4,047,914, Cl. 55-488.000.
Druge, Gerard; and Troccaz, Roger, to Societe Nouvelle de Roulements. Bearing race rolling device. 4,047,414, Cl. 72-91.000.
DSO "Mlechna Promishlenost": *See*—
Kondratenko, Maria Stefanova; Nachev, Lyubomir Todorov; Dedova, Petrushka Atanassova; and Antonova, Tamara Nikolaevna, 4,048,339, Cl. 426-39.000.
Dual Gebruder Steidinger: *See*—
Hermann, Hans, 4,047,721, Cl. 274-9.00A.
Dubell, Robert L.: *See*—
Green, Robert C.; and Dubell, Robert L., 4,048,054, Cl. 208-8.000.
Dubin, Robert R.: *See*—
Chatterji, Debajyoti; and Dubin, Robert R., 4,048,390, Cl. 429-102.000.
Duckworth, Grover G., Jr.: *See*—
Paterson, James G. T.; Watkins, Charles W.; and Duckworth, Grover G., Jr., 4,047,271, Cl. 28-220.000.
Ducon Company, Inc., The: *See*—
Krockta, Harry, 4,047,910, Cl. 55-235.000.
Duff, Edward John: *See*—
Tomlinson, Kenneth; and Duff, Edward John, 4,048,300, Cl. 424-52.000.
Duffey, Thomas E.: *See*—
Coleman, William R.; and Duffey, Thomas E., 4,048,302, Cl. 424-78.000.
Duke, Jimmy R.: *See*—
Miller, Walter E., Jr.; Duke, Jimmy R.; and Sitton, Robert L., 4,047,678, Cl. 244-3.160.

Duke, John A. Well cementing method and apparatus. 4,047,566, Cl. 166-285.000.

Duncan, William Palmer, to Cunningham, Van Buren, II, a part interest. Fishing device. 4,047,319, Cl. 43-44.870.

Dunlop Limited: *See—*
Moring, Peter Lothar Ernst; and Raines, Kenneth William John, 4,048,362, Cl. 428-36.000.

Du Pont de Nemours, E. I., and Company: *See—*
Bissot, Thomas Charles, 4,048,096, Cl. 252-430.000.
Blake, Ralph Kingsley, deceased, 4,047,956, Cl. 96-60.00R.
Bouchard, Robert Joseph; and Brixner, Lothar Heinrich, 4,048,546, Cl. 361-321.000.
Eastman, Ernest Francis, 4,048,128, Cl. 260-22.00R.
Green, Ralph V., 4,048,292, Cl. 423-415.00A.
Jones, Frank N., 4,048,207, Cl. 260-448.80R.
Lee, Jerald Dana, 4,048,493, Cl. 250-205.000.
Morgan, Paul Winthrop, 4,048,148, Cl. 260-72.500.
Vassiliou, Eustathios, 4,047,480, Cl. 101-123.000.
Zimmerman, Joseph, 4,048,279, Cl. 264-184.000.

Durant, Graham John: *See—*
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,048,319, Cl. 424-269.000.

Durr-Dental KG.: *See—*
Hofmann, Hans-Joachim, 4,047,909, Cl. 55-184.000.

Dyakov, Valery Mikhailovich: *See—*
Voronkov, Mikhail Grigorievich; and Dyakov, Valery Mikhailovich, 4,048,206, Cl. 260-448.80R.

Dyckerhoff Zementwerke AG: *See—*
zurStrassen, Heinrich; and Rauschenfels, Eberhard, 4,047,968, Cl. 106-281.00R.

Dyer, Norman Dean, to Dresser Industries, Inc. Earth boring cutting element retention system. 4,047,583, Cl. 175-410.000.

Dynacast International Limited: *See—*
Gutai, Ferenc, 4,047,669, Cl. 239-540.000.

Dynamic Instrument Corporation: *See—*
Gietzen, James J., 4,047,786, Cl. 339-154.00A.

Dynamit Nobel Aktiengesellschaft: *See—*
Bockstiegel, Gerd-Edzard; Neidhardt, Manfred; and Rehfeld, Gerhard, 4,048,119, Cl. 252-521.000.
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensick, Hans-Joachim, 4,048,374, Cl. 428-457.000.

Dynetics, Inc.: *See—*
Crankshaw, John H., 4,047,602, Cl. 192-53.00F.

Dyno Industrier A.S.: *See—*
Ostern, Sverre Ludvik, 4,047,989, Cl. 149-109.600.

E. I Du Pont de Nemours and Company: *See—*
Langsdorf, William P., Jr., 4,048,156, Cl. 260-239.00A.

E M I Limited: *See—*
Hounsfield, Godfrey Newbold, 4,048,505, Cl. 250-445.00T.

E. R. Squibb & Sons, Inc.: *See—*
Chen, James Ling; and Battaglia, Jean M., 4,048,309, Cl. 424-238.000.
Chen, James Ling; and Battaglia, Jean M., 4,048,310, Cl. 424-238.000.
Denzel, Theodor; and Hoehn, Hans, 4,048,182, Cl. 260-295.50B.
Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., 4,048,231, Cl. 260-570.700.
Hoehn, Hans, 4,048,184, Cl. 260-296.00H.

Eames, Loren W.; Berg, Joseph A.; and McAllister, Thomas W. Seating structures with flexible backs. 4,047,757, Cl. 297-230.000.

Earle, Michael, to Caterpillar Tractor Co. Method of and means for making a metalic bond to powdered metal parts. 4,048,459, Cl. 219-85.0BM.

Eason, Celvie L. Leak detector for engine chambers. 4,047,423, Cl. 73-49.800.

Eastman, Ernest Francis, to Du Pont de Nemours, E. I., and Company. Thermally stabilized segmented copolyester adhesive. 4,048,128, Cl. 260-22.00R.

Eastman Kodak Company: *See—*
Pfaff, Maurice Edgar, 4,047,952, Cl. 96-29.00R.
Pfaff, Maurice Edgar, 4,047,953, Cl. 96-29.00D.
Rossi, Louis J.; and Regan, Michael T., 4,047,944, Cl. 96-1.200.
Watkins, Joseph Albert, 4,048,004, Cl. 156-580.100.
Williams, David Alan; Sperber, Karl; and Stoutz, Calvin Owen, 4,047,992, Cl. 156-73.100.
Wilson, John Charles, 4,048,146, Cl. 260-63.0UY.

Eaton Corporation: *See—*
Buttriss, A. T., 4,047,268, Cl. 24-274.00R.
Coldren, Chester P., 4,047,463, Cl. 85-62.000.

Eddy, Robert Truman, to Reliance Electric Company. Belt conveyor drive mechanism. 4,047,452, Cl. 74-752.00C.

Edwards, Hugh Jeremy Willis, to CCL Systems Limited. Press for swaging metal sleeves. 4,047,420, Cl. 72-416.000.

Ehrlund, Ake. Ticket dispensing assembly for dispensing tickets from a flexible strip. 4,047,652, Cl. 225-54.000.

Eibl, Volker, to Sachs-Systemtechnik GmbH. Electrolytic purification of aqueous liquids in the presence of silver ions. 4,048,032, Cl. 204-151.000.

Eibl, Volker; and Reis, August, to Sachs-Systemtechnik GmbH. Water-purifying apparatus. 4,048,044, Cl. 204-257.000.

Eibofner, Eugen, to Kaltenbach & Voigt. Dental handpiece. 4,047,301, Cl. 32-27.000.

Eichelberger, James W.; Kent, Frederick M.; and Sokol, Michael, to Bio/Data Corporation. Method and apparatus for determining deficiencies in enzymatic reactors particularly clotting factor levels in blood plasmas. 4,047,890, Cl. 23-230.00B.

Eichelberger, Warren Evan: *See—*
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,048,254, Cl. 260-859.00R.
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,048,255, Cl. 260-859.00R.

Eiland, P. Frank: *See—*
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,047,491, Cl. 112-79.00A.

Eischens, Richard G.: *See—*
Grunstad, Jerome A.; and Eischens, Richard G., 4,047,637, Cl. 221-265.000.

Eisenberg, Hans Jochen. Scaffold and platform adaptable for assembly and disassembly. 4,047,594, Cl. 182-153.000.

Eisenwerk-Gesellschaft Maximilianshutte mbH: *See—*
Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, 4,047,707, Cl. 266-222.000.

Electric Power Research Institute, Inc.: *See—*
Chatterji, Debajyoti; and Dubin, Robert R., 4,048,390, Cl. 429-102.000.

Electrochem, Inc.: *See—*
Lala, Arun, 4,048,408, Cl. 429-229.000.

Elektra Tailfingen Ammann & Cie: *See—*
Groth, Otto, 4,048,599, Cl. 335-20.000.

El-Ghatta, Hussain; and Forrer, Johann Karl, to Inventa AG fur Forschung und Patentverwertung. Process for preparing hydroxylammonium salts. 4,048,291, Cl. 423-387.000.

Eli Lilly and Company: *See—*
Barnett, Charles J., 4,048,211, Cl. 260-465.00E.
Cooper, Robin D. G.; and Spry, Douglas O., 4,048,157, Cl. 260-239.00A.
Koppel, Gary A., 4,048,160, Cl. 544-21.000.
Koppel, Gary A., 4,048,163, Cl. 544-21.000.
Kukolja, Stjepan; and Murphy, Charles F., 4,048,162, Cl. 544-22.000.
Lacefield, William B., 4,048,312, Cl. 424-248.560.
Ludwig, Nelson Henry, 4,048,268, Cl. 264-15.000.
Lunn, William H. W.; and Mason, Edward V., 4,048,161, Cl. 544-27.000.

Elkhart Products Corporation: *See—*
Holmgren, Marvin E., 4,047,412, Cl. 72-58.000.

Ellis, Arthur S., to Blue Giant Equipment Corporation. Pallet truck automatic lift. 4,047,698, Cl. 254-2.00R.

Ellis, Darwin V., to Schlumberger Technology Corporation. Doubly-compensated dual-detector density logging apparatus. 4,048,495, Cl. 250-264.000.

Elmgren, Karl Arne Stig: *See—*
Thyberg, Bertil Sven Johan; and Elmgren, Karl Arne Stig, 4,047,709, Cl. 269-22.000.

Elser, Wolfgang; and Epple, Gerhard, to BASF Aktiengesellschaft. Production of aminonitrodihydroxyanthraquinones by partial reduction dinitrodihydroxyanthraquinones. 4,048,199, Cl. 260-380.000.

Emerson Electric Co.: *See—*
Kieffer, Vernon E., 4,047,293, Cl. 29-736.000.
Stahlhut, Leo G.; and Garnett, Willard R., 4,047,336, Cl. 52-28.000.

EMI Limited: *See—*
Taylor, Stanley, 4,048,503, Cl. 250-385.000.

Emmerich, Werner S., to Westinghouse Electric Corporation. Vacuum switch contact materials. 4,048,117, Cl. 252-513.000.

Emmett, John Colin: *See—*
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,048,319, Cl. 424-269.000.

Encor Limited: *See—*
Hurtig, Carl R., 4,047,462, Cl. 85-3.00R.

Eng, Jeffrey D.; Cook, Edward H., Jr.; and Figueras, Wilfredo E., to Hooker Chemicals & Plastics Corporation. Lengthening anode life in electrolytic cell having molded body. 4,048,045, Cl. 204-263.000.

Eng, William T.: *See—*
Marsh, Norman F.; and Eng, William T., 4,047,434, Cl. 73-304.00R.

Engeler, William E.: *See—*
Goldberg, Howard S.; and Engeler, William E., 4,048,525, Cl. 307-353.000.

Engelhard Minerals & Chemicals Corporation: *See—*
Flanagan, Paul, 4,047,877, Cl. 431-8.000.
Horton, Norman H.; and Smith, John L., 4,048,284, Cl. 423-112.000.
Isaac, Peter A. H.; and Oulton, T. Dixon, 4,047,738, Cl. 282-27.500.

Engelhardt, Edward L., to Merck & Co., Inc. 3-Dimethylsulfamoyl-5-[amino(alky] or alkylidene)]-5H-dibenzo [a,d]cycloheptenes. 4,048,223, Cl. 260-556.0AR.

Engelhardt, Friedrich; Hille, Martin; and Ulmschneider, Dieter, to Hoechst Aktiengesellschaft. Aqueous clay base mud for deep drilling. 4,048,077, Cl. 252-8.50C.

Engstrom, Axel Erik Konstantin: *See—*
Asplund, Frank Eskil William; and Engstrom, Axel Erik Konstantin, 4,047,559, Cl. 165-7.000.

Enomoto, Hirobumi, to Fuji Photo Film Co., Ltd. Photographic color densitometer check plate. 4,047,817, Cl. 356-175.000.

Entzmann, Karl: *See—*
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.

Environmental Elements Corporation: *See—*
Pearre, Stephen G.; and Craighead, Bobby L., 4,048,076, Cl. 210-528.000.

Epple, Gerhard: *See—*
Elser, Wolfgang; and Epple, Gerhard, 4,048,199, Cl. 260-380.000.

Epsilon Lambda Electronics Corporation: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,048,589, Cl. 331-107.00R.

Epstein, James; and Chin, Arthur Y., to GTE Laboratories Incorporated. Hermetically sealed primary electrochemical cell and a method for its production. 4,048,401, Cl. 429-171.000.

Epstein, Joseph; and Berkowitz, Lewis M., to United States of America, Army. Simulant compound and method for testing an agent alarm. 4,048,022, Cl. 204-1.00T.

Epstein, Martin: *See—*
Casey, Donald James; and Epstein, Martin, 4,048,256, Cl. 260-860.000.

Erickson, John W., to Kobe, Inc. Multistage, downhole, turbo-powered intensifier for drilling petroleum wells. 4,047,581, Cl. 175-95.000.

Erickson Tool Company: *See—*
Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, 4,047,829, Cl. 408-169.000.

Ernest Leitz GmbH: *See—*
Hartmann, Horst, 4,048,492, Cl. 250-201.000.

Ervin Industries, Inc.: *See—*
Kuehn, Udo, 4,047,334, Cl. 51-422.000.

ESB Incorporated: *See—*
Megahed, El Sayed, 4,048,405, Cl. 429-206.000.

Eschenauer, Paul R.; and Main, George, to Republic Steel Corporation. Heat recuperator and shroud for radiant tube burner. 4,047,881, Cl. 431-215.000.

Eschenfelder, Gunther; and Schultz, Rudiger, to Kraftwerk Union Aktiengesellschaft. Control rod drive for nuclear reactors. 4,048,010, Cl. 176-36.00R.

Escher Wyss Limited: *See—*
Biondetti, Mario, 4,047,273, Cl. 29-116.0AD.
Lehmann, Rolf, 4,047,274, Cl. 29-121.400.

Eskeli, Michael. Dual rotor heat exchanger. 4,047,392, Cl. 62-402.000.

Etat Francais: *See—*
Kervizic, Jean; Deslandes, Claude; and Berson, Alain, 4,047,482, Cl. 102-19.200.

Ettenberg, Michael; and Lockwood, Harry Francis, to RCA Corporation. Electroluminescent semiconductor device having a restricted current flow. 4,048,627, Cl. 357-17.000.

Eue, Ludwig: *See—*
Schmidt, Robert R.; Eue, Ludwig; and Draber, Wilfried, 4,047,929, Cl. 71-93.000.

Evans, Robert J., to Aurora Equipment Company. Pallet rack and decking combination. 4,048,059, Cl. 108-155.000.

Evans, Ronald C.; and Corderman, Sidney A., to McIntosh Laboratory, Incorporated. Amplifier improvements for limiting clipping. 4,048,573, Cl. 330-2.000.

Eve, Norman C. Rake. 4,047,370, Cl. 56-377.000.

Everbrite Electric Signs, Inc.: *See—*
Slack, Roger A.; and Michel, Gerald W., 4,047,314, Cl. 40-28.00C.

Exploaterings Aktiebolaget T.B.F.: *See—*
Axen, Rolf Erik Axel Verner; Porath, Jerker Olof; and Carlsson, Per Jan Erik, 4,048,416, Cl. 526-9.000.

Exxon Research and Engineering Company: *See—*
Baldwin, Francis P.; Rae, James A.; and Ver Strate, Gary, 4,048,258, Cl. 260-879.000.
Cahn, Robert P.; and Siskin, Michael, 4,048,251, Cl. 260-683.680.
Green, Robert C.; and Dubell, Robert L., 4,048,054, Cl. 208-8.000.
Harding, John W.; and Keller, James P., 4,048,364, Cl. 428-113.000.
Kuntz, Irving, 4,048,425, Cl. 526-245.000.
Riley, Kenneth L., 4,048,060, Cl. 208-210.000.
VanAuken, Richard L., 4,047,731, Cl. 280-281.00B.

Eymard, Pierre: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, 4,048,334, Cl. 424-325.000.

Eysermans, Hubert, to Sprague Electric Company. Stress-free hall-cell package. 4,048,670, Cl. 361-421.000.

F. J. Littell Machine Company: *See—*
Johnson, Kenneth C., 4,047,416, Cl. 72-183.000.

Fabbian, Bruno. Gypsum dust diluents for use in pesticides and fertilizing products. 4,048,337, Cl. 424-357.000.

Fahey, Darryl R.: *See—*
Gardner, Lloyd E.; Fahey, Darryl R.; and Mahan, John E., 4,048,238, Cl. 260-618.00R.

Fairchild Industries, Inc.: *See—*
Smith, Gordon A.; and Talcott, James M., 4,047,339, Cl. 52-108.000.

Faiz, Robert L.: *See—*
Ferris, Donald L.; and Faiz, Robert L., 4,047,838, Cl. 416-115.000.

Falbe, Jurgen; and Hahn, Heinz-Dieter, to Ruhrchemie Aktiengesellschaft. Process for preparing a synthesis gas suitable as starting material for the oxo-synthesis. 4,048,233, Cl. 260-604.0HF.

Falkowski, Edward C.; and Ruppel, Carl E., to Allegheny Ludlum Industries, Inc. Process for producing soft magnetic material. 4,047,983, Cl. 148-105.000.

Falterman, Charles W.; and Sbrocca, Dino A., to United States of America, Navy. Plastic bonded explosive composition. 4,047,990, Cl. 149-19.200.

Fangmeier, Ralf; and Goeke, Alfons, to Kieserling & Albrecht. Combined drawing and straightening machine for metallic tubes or rods. 4,047,418, Cl. 72-278.000.

Farley, David L.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,047,564, Cl. 166-72.000.

Farmila Farmaceutici: *See—*
de Ruggieri, Pietro; and Sighinolfi, Orazio, 4,048,159, Cl. 260-239.55R.

Farrell, John Jerome, to Consupak, Inc. Apparatus for making multilayered blow molded articles. 4,047,873, Cl. 425-523.000.

Fassbinder, Hans Georg: *See—*
Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, 4,047,707, Cl. 266-222.000.

Fauran, Claude P.; Raynaud, Guy M.; Turin, Michel J.; and Thomas, Janine M., to Delalande S.A. N'-substituted derivatives of 4'-(N-piperazinylmethyl)spiro dibenzocycloheptadi- (or tri-) ene-5,2'-dioxolane(1',3'). 4,048,164, Cl. 544-121.000.

Feather Safety Razor Company, Ltd.: *See—*
Ishida, Minoru; and Ozeki, Shigeru, 4,047,296, Cl. 30-41.000.

Fecker, Josef; and Memminger, Gustav, to Gustav Memminger Verfahrenstechnik fur die Maschenindustrie, Firma. Yarn guide finger for positive yarn supply apparatus. 4,047,398, Cl. 66-132.00R.

Fein, Michael E.: *See—*
Hinson, David C.; Bode, Wolfgang W.; Fein, Michael E.; and Hoehn, H. Joseph, 4,048,533, Cl. 313-188.000.

Feldstein, Nathan. Method of preparation and use of novel electroless plating catalysts. 4,048,354, Cl. 427-304.000.

Felfoldi, Karoly: *See—*
Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.

Feliciano Aranzabal Y Cia, S.A.: *See—*
Aranzabal, Feliciano, 4,047,407, Cl. 70-52.000.

Fengler, Werner H. High-wear-resistant composite machine element. 4,048,382, Cl. 428-651.000.

Ferch, Rudolf, to Fischer Gesellschaft m.b.H. Ski having a patterned top covering. 4,047,735, Cl. 280-610.000.

Ferranti Limited: *See—*
Clarke, Graham Morley; and Fisher, George, 4,048,510, Cl. 250-563.000.

Ferris, Donald L.; and Faiz, Robert L., to United Technologies Corporation. Blade pitch control mechanism for helicopters. 4,047,838, Cl. 416-115.000.

Ferris, Donald Leroy; and Noehren, William Lawrence, to United Technologies Corporation. Torque reacting means for the hubs of cross beam rotors. 4,047,839, Cl. 416-134.00A.

Fertilizantes Fosfatados Mexicanos, S.A.: *See—*
Pierres, Sergio Ortega, 4,048,289, Cl. 423-317.000.

Fetchin, John Allan: *See—*
Barber, William Austin; and Fetchin, John Allan, 4,048,226, Cl. 260-561.00N.

Fett, Darrell L., to Honeywell Information Systems Inc. Memory device. 4,048,626, Cl. 340-173.00R.

Fiberlok, Inc.: *See—*
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,047,991, Cl. 156-62.600.

Fiedler, Mark A.; and Hart, Darrell M., to Riff Rite, Inc. Drumstick. 4,047,460, Cl. 84-422.00S.

Fielding, Ivor R.: *See—*
Keske, Robert G.; Poppe, Wassily W.; and Fielding, Ivor R., 4,048,131, Cl. 260-33.20R.

Figueras, Wilfredo E.: *See—*
Eng, Jeffrey D.; Cook, Edward H., Jr.; and Figueras, Wilfredo E., 4,048,045, Cl. 204-263.000.

Filippov, Vladimir Jurievich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.

Fink, August A., Jr.; and Mackisoc, Noel J., to Fink, August A., Jr. Automatic cassette reproducing apparatus. 4,048,659, Cl. 360-72.000.

Firkins, Morris L.: *See—*
Miller, James A.; and Firkins, Morris L., 4,048,651, Cl. 358-8.000.

Firmenich S.A.: *See—*
Rautenstrauch, Valentin, 4,048,120, Cl. 252-522.000.

Fischer, Arno. Rotary piston engine. 4,047,857, Cl. 418-153.000.

Fischer Gesellschaft m.b.H.: *See—*
Ferch, Rudolf, 4,047,735, Cl. 280-610.000.

Fischer, Rolf: *See—*
Weitz, Hans-Martin; Kahr, Kurt; and Fischer, Rolf, 4,048,165, Cl. 544-166.000.

Fisher, George: *See—*
Clarke, Graham Morley; and Fisher, George, 4,048,510, Cl. 250-563.000.

Fives-Cail Babcock: *See—*
Chielens, Alain, 4,047,769, Cl. 308-121.000.

Flanagan, James Loton: *See—*
Crochiere, Ronald Eldon; Flanagan, James Loton; and Webber, Susan Anne, 4,048,443, Cl. 179-1.0SA.

Flanagan, Paul, to Engelhard Minerals & Chemicals Corporation. Combustion method and apparatus. 4,047,877, Cl. 431-8.000.

Fletcher, Wade D.; and Rowe, E. Riley, to Sonoco Products Company. Assembly system for container flexible end closures. 4,047,473, Cl. 93-36.00B.

Flint, Alan G., to GCA Corporation. Mask plate handling method. 4,047,627, Cl. 214-152.000.

Flores, Jose. Portable variable intensity signalling flashlight. 4,048,631, Cl. 340-321.000.

FMC Corporation: *See—*
Bassendale, Derrick Arthur; and Bartram, Derrick, 4,047,546, Cl. 141-1.00R.

Fogelberg, Mark John; and Kelbel, Donald William, to Borg-Warner Corporation. Automatic four-wheel drive transfer case. 4,047,601, Cl. 192-36.000.

Foote, Daniel J., to Master Lock Company. Anti-rap mounting for permutation lock elements. 4,047,406, Cl. 70-25.000.

Ford Motor Company: *See—*
Heintz, Walter K.; and Lingscheit, James N., 4,048,393, Cl. 429-104.000.
Hough, Jerome F.; and Hamburg, Douglas R., 4,047,512, Cl. 123-122.00E.
Ludwig, Frank A., 4,048,394, Cl. 429-104.000.

Fordyce, Homer E.; and Carter, William C., to Marley Company, The. Deicing apparatus for water cooling towers including slotted distribution basin and selectively actuatable valve mechanism. 4,048,265, Cl. 261-111.000.

Foreman, Calvin I. Implement for levelling levees. 4,047,574, Cl. 172-178.000.

Forgo, Eric J.: *See—*
Magoveny, George S.; and Forgo, Eric J., 4,047,834, Cl. 415-3.000.

FORM-PLAST GmbH: *See—*
Winter, Wilhelm; and Held, Artur, 4,047,690, Cl. 249-66.00A.

Formac International AB: *See—*
Bergstrom, Torsten, 4,047,337, Cl. 52-71.000.

Forman, Aubry S., Jr.; Schultz, Charles A., Jr.; and Vice, William E., to Digital Data Inc. Secure two channel SCA broadcasting system. 4,048,619, Cl. 340-154.000.

Formhals, Bruce I.: *See—*
Muskovac, Nicholas G.; and Formhals, Bruce I., 4,048,520, Cl. 307-252.00Q.

Forney, Edgar Wilmot, Jr.; and Hogendobler, Richard Shure, to AMP Incorporated. Port hole coaxial connector. 4,047,788, Cl. 339-177.00R.

Forrer, Johann Karl: *See—*
El-Ghatta, Hussain; and Forrer, Johann Karl, 4,048,291, Cl. 423-387.000.

Forrest, Lew. Piano key button alignment tool. 4,047,461, Cl. 84-458.000.

Forsythe, Alan K.; and Green, Charles J., to Red Dot Corporation. Pressure switch with plural axes pivoted conduction plate. 4,048,455, Cl. 200-81.400.

Foseco Trading A.G.: *See—*
Courtenay, John Henry; and Wardell, Martin Bernard Peter, 4,048,134, Cl. 260-38.000.

Foster, Gene B., to Boeing Company, The. Numerically controlled pyramid roll forming machine. 4,047,411, Cl. 72-7.000.

Foucher, Walter D., Jr.: *See—*
Dorn, Peter; and Foucher, Walter D., Jr., 4,047,900, Cl. 44-68.000.

Foust, Robert K. Slide assembly. 4,047,767, Cl. 308-3.600.

Fowler, William B.: *See—*
Vander Arend, Peter C.; and Fowler, William B., 4,048,437, Cl. 174-15.00S.

Fox Pool Corporation: *See—*
Witte, Donald H.; and Weir, Donald H., 4,047,340, Cl. 52-169.700.

Fox, Rita T.: *See—*
Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., 4,048,231, Cl. 260-570.700.

Francis, John Frederick, to Gillette Company, The. Shaving unit dispenser container. 4,047,295, Cl. 30-40.200.

Francke, Diethard: *See—*
Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, 4,048,047, Cl. 204-270.000.

Franckowiak, Sigismond: *See—*
Renault, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Dezael, Claude, 4,048,293, Cl. 423-574.00L.

Francois, Bernard; Vernois, Michel; and Franta, Emile, to Agence Nationale de Valorisation de la Recherche (ANVAR). Polymerizations catalyzed by very finely divided lithium. 4,048,420, Cl. 526-173.000.

Franta, Emile: *See—*
Francois, Bernard; Vernois, Michel; and Franta, Emile, 4,048,420, Cl. 526-173.000.

Frede Hilmar Drostholm: *See—*
Hansen, Torben Christen; and Ringsholt, Thomas, 4,048,276, Cl. 264-79.000.

Fredriksson, Lars Evert; Jacobson, Gunnar; and Olsson, Olof Bertil, to AB Bofors. Umbilical cord breaker. 4,047,464, Cl. 89-1.811.

Freeman Chemical Corporation: *See—*
Svoboda, Glenn R.; Suh, John T.; Carlstrom, William L.; and Maechtle, Gary L., 4,048,104, Cl. 260-2.5AN.

Freitag, Dieter: *See—*
Tresper, Erhard; Neuray, Dieter; and Freitag, Dieter, 4,048,200, Cl. 260-395.000.

Fremont Industries, Inc.: *See—*
Chang, Edward H., 4,048,121, Cl. 252-527.000.

Frese, Albert; Dittmann, Walter; and Kilian, Wolfgang, to Chemische Werke Huls Aktiengesellschaft. Process for the production of partially crystalline polybutene-1. 4,048,419, Cl. 526-153.000.

Fried, John H.; and Harrison, Ian T., to Syntex Corporation. Compositions containing 2-(6'-substituted-2'-naphthyl)acetic acid esters used for treating inflammation, pain or pyrexia. 4,048,330, Cl. 424-308.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Kruger, Heinrich, 4,047,830, Cl. 408-239.00A.

Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, to BASF Aktiengesellschaft. Manufacture of olefin polymers. 4,048,414, Cl. 526-106.000.

Fritz, Jacques; Roux, Paul; and Neel, Jean, to Rhone-Poulenc Industries. Water-soluble sulfonated polyesters. 4,048,149, Cl. 260-75.00S.

Fritzsche, Gerhard, to Gesellschaft fur Kernforschung m.b.H. Method of measuring the oil consumption of internal combustion engines. 4,048,497, Cl. 250-303.000.

Frondorf, William A., to SCM Corporation. Process for heating condensate. 4,047,386, Cl. 60-654.000.

Front Discharge Mixer, Inc.: *See—*
Daoust, Ralph R.; and Daoust, Timothy N., 4,047,604, Cl. 193-10.000.

Frossati, Giorgio: *See—*
Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, 4,047,436, Cl. 73-362.0SC.

Frost, Robert F., to United States of America, Army. Rectifier controlled circuit. 4,048,513, Cl. 307-28.000.

Frost, Robert Walter; and Morris, Anne Winnifred, to R. W. Frost Limited. Knitting braids. 4,047,399, Cl. 66-149.00R.

Frueauff, Harry D., Jr. Method of forming a product of two different metals. 4,047,658, Cl. 228-115.000.

Fuji Photo Film Co., Ltd.: *See—*
Enomoto, Hirobumi, 4,047,817, Cl. 356-175.000.
Gale, Preston Lee; and Stafford, Warren Jess, 4,048,464, Cl. 219-121.0LM.
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ogawa, Akira, 4,047,964, Cl. 96-126.000.
Ooba, Seiichi; and Hirayama, Shinichi, 4,048,253, Cl. 260-858.000.
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, 4,047,958, Cl. 96-87.00R.

Fuji Photo Optical Co., Ltd.: *See—*
Numata, Saburo, 4,048,644, Cl. 354-60.00L.

Fujii, Shinichi: *See—*
Matsushita, Kunichi; Sakurada, Hikaru; Onuma, Kazuhiko; and Fujii, Shinichi, 4,048,112, Cl. 252-461.000.

Fujisaki, Yoshinori: *See—*
Matsuda, Yoshio; and Fujisaki, Yoshinori, 4,047,402, Cl. 66-195.000.

Fujita, Yutaka: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.

Fujitok Co., Ltd.: *See—*
Yanagida, Hiroaki; and Ohashi, Tsuneo, 4,047,971, Cl. 134-2.000.

Fujitsu Limited: *See—*
Ishii, Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, 4,048,656, Cl. 358-261.
Sagawa, Masato; Sakai, Takeaki; Sasaki, Tatsuji; and Henmi, Zenzo, 4,047,982, Cl. 148-101.000.

Fukushima, Masami: *See—*
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,048,155, Cl. 542-422.000.

Fuller, David W., to Addmaster Corporation. Key controlled lock. 4,047,409, Cl. 70-356.000.

Fuller, Edward N., to Phillips Petroleum Company. Liquid chromatographic analysis for styrene-butadiene monomers. 4,047,892, Cl. 23-232.00C.

Furutsuka, Takashi: *See—*
Ogawa, Masaki; Furutsuka, Takashi; and Ishikawa, Masaoki, 4,048,646, Cl. 357-15.000.

Fussell, Theodore John, Jr., to Neptune Eastech, Inc. Bluff body flowmeter including shield-channel arrangement. 4,047,432, Cl. 73-194.0VS.

Fuziwara, Shuzo: *See—*
Kusakabe, Masao; Fuziwara, Shuzo; and Shiino, Kazuo, 4,047,987, Cl. 149-37.000.

G.A.O. Gesellschaft fur Automation und Organisation mbH: *See—*
Haberstroh, Markus, 4,047,472, Cl. 93-93.00D.

G. D. Searle & Co.: *See—*
Beck, Charles I.; and Layton, Roger M., 4,048,202, Cl. 260-410.600.

G. Siempelkamp & Co.: *See—*
Axer, Heinrich; and Roth, Gerd, 4,047,865, Cl. 425-80.000.

Gabot Corporation: *See—*
Lee, Kam Bor, 4,048,290, Cl. 423-336.000.

Gabus, Jean-Claude, to Carba S.A. Control device of a teletypewriter to be used by invalids. 4,048,439, Cl. 178-17.00C.

Gaertner, Van R.; and Hamm, Philip C., to Monsanto Company. N-(2-hydroxyalkyl) derivatives of N-phosphonomethylglycine and the herbicidal use thereof. 4,047,927, Cl. 71-86.000.

Gal, George: *See—*
Chemerda, John M.; and Gal, George, 4,048,224, Cl. 260-534.00C.

Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, to Medizinska Akademia. Method for treating a picorna virus infection. 4,048,333, Cl. 424-322.000.

Galdal, Jon S. Game including novel board and play pieces. 4,047,720, Cl. 273-130.00R.

Gale, Preston Lee; and Stafford, Warren Jess, to Fuji Photo Film Co., Ltd. Method of and means for cutting hose for high pressure hydraulic systems. 4,048,464, Cl. 219-121.0LM.

Galinke, Joachim: *See—*
Wegemund, Bernd; and Galinke, Joachim, 4,048,259, Cl. 260-881.000.

Galluzzo, Vincent. Recuperative heating system. 4,047,490, Cl. 110-56.000.

Ganellin, Charon Robin: *See—*
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,048,319, Cl. 424-269.000.

Gannon, John Allister: *See—*
Shen, Kwan Ting; Gannon, John Allister; and Nelson, Robert Charles, 4,048,179, Cl. 260-29.40R.
Garber, Michael B.: *See—*
Cox, John T.; Garber, Michael B.; Jasper, Marilyn A.; and LoVecchio, Paul, 4,048,535, Cl. 313-367.000.
Garden Pro, Inc.: *See—*
Bair, Lester E., 4,047,299, Cl. 30-276.000.
Gardner, Lloyd E.; Fahey, Darryl R.; and Mahan, John E., to Phillips Petroleum Company. Promoted liquid phase oxidation of alkyl aromatic compounds. 4,048,238, Cl. 260-618.00R.
Garnett, Willard R.: *See—*
Stahlhut, Leo G.; and Garnett, Willard R., 4,047,336, Cl. 52-28.000.
Garoutte, Kurt F., to Honeywell Inc. Crimp seal using polyphenylene sulfide plastic with an aluminum terminal pan. 4,048,392, Cl. 429-105.000.
Garrett Corporation, The: *See—*
Jansen, Harvey B., 4,047,589, Cl. 180-108.000.
Garwood, William E.; Jacob, Solomon M.; Kuo, James C.; and Wise, John J., to Mobil Oil Corporation. Conversion of natural gas to gasoline and LPG. 4,048,250, Cl. 260-683.430.
Gary, Wardell; and Lange, Emroy W., to Westinghouse Electric Corporation. Solid state break-before-make base module and associated contact elements. 4,048,522, Cl. 307-293.000.
Gaschet, Michel Marceau: *See—*
Havard, Jean Francois Pierre Marie; Gaschet, Michel Marceau; and Charonnat, Henri Marie Dominique, 4,048,547, Cl. 318-488.000.
Gasser, Rupert Josef; and Watercutter, Steven N., to Societe d'Assistance Technique Pour Produits Nestle S.A. Preparation of tea extracts. 4,048,344, Cl. 426-385.000.
GCA Corporation: *See—*
Flint, Alan G., 4,047,627, Cl. 214-152.000.
General Electric Company: *See—*
Bailey, Cecil; Balchunas, Walter C.; and Zlupko, John E., 4,048,348, Cl. 427-34.000.
Bennett, Moreland P.; and Hobbs, Albert M., Jr., 4,048,460, Cl. 219-91.000.
Bennett, Moreland P.; and Bowers, William L., 4,048,463, Cl. 219-118.000.
Brookes, Neil Roger; Ray, Martin George; Cohen, Joseph David; and McCarey, Thomas Joseph, 4,047,379, Cl. 60-39.09D.
Carino, John W., 4,047,790, Cl. 339-220.00C.
Dobberpuhl, Daniel W., 4,048,590, Cl. 331-116.00R.
Goldberg, Howard S.; and Engeler, William E., 4,048,525, Cl. 307-353.000.
Harris, Samuel C., Jr.; and Surber, William A., 4,048,625, Cl. 364-900.000.
Hay, Allan S.; and White, Dwain M., 4,048,143, Cl. 260-47.0ET.
Jaster, Heinz; and Staub, Fred W., 4,047,561, Cl. 165-32.000.
Johnson, Donald S.; and Williams, Frank J., III, 4,048,190, Cl. 260-326.00N.
Kewley, Norman E., 4,048,487, Cl. 240-1.300.
Liu, Yung S., 4,048,515, Cl. 307-88.300.
Noeske, Heinz Otto, 4,048,456, Cl. 200-148.00A.
Owen, Daniel V.; and Knoble, David W., 4,048,543, Cl. 315-205.000.
Pomeroy, Bruce D.; and Kosky, Philip G., 4,048,529, Cl. 310-54.000.
Smith, William Edward, 4,048,239, Cl. 260-624.00C.
Staub, Fred W.; and Jaster, Heinz, 4,048,603, Cl. 336-57.000.
Takeoshi, Tohru, 4,048,142, Cl. 260-47.0CP.
Walker, Loren H.; and Kornrumpf, William P., 4,048,539, Cl. 315-176.000.
General Foods Corporation: *See—*
Haas, Gerhard Julius; and Herman, Edwin Bernard, 4,048,342, Cl. 426-129.000.
Katz, Saul Norman, 4,048,345, Cl. 426-432.000.
General Motors Corporation: *See—*
Hanson, Robert S.; and Rigg, Ralph R., 4,047,393, Cl. 62-428.000.
McQuinn, Ted M., 4,047,454, Cl. 74-868.000.
Williams, Jerry K.; and Landmesser, Franklin D., 4,047,732, Cl. 280-287.000.
General Portland, Inc.: *See—*
Alderete, William Eugene; Boyer, John Parke; Daugherty, Kenneth Earl; and Johnson, David Lee, 4,047,961, Cl. 106-89.000.
General Tire & Rubber Company, The: *See—*
Gormish, Kenneth J.; Hofelt, Clarence, Jr.; Lavecchia, Silvano Anthony; and Ripley, Clarence Arthur, Jr., 4,047,338, Cl. 51-106.00R.
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,048,427, Cl. 526-337.000.
Geode Industries, Inc.: *See—*
Smith, Edward Earl, 4,047,343, Cl. 51-313.000.
Geometric Data Corporation: *See—*
Hart, Donald J.; Bouton, John C., Jr.; and Poppel, Eugene H., 4,048,616, Cl. 340-146.3ED.
George, Brian Victor; and Drayrer, Colin James, to Nuclear Power Company (Whetstone Limited). Nuclear power installations. 4,048,012, Cl. 176-60.000.
George, Edwin Francis: *See—*
Parry, Keith Peter; and George, Edwin Francis, 4,047,924, Cl. 71-76.000.
Gerecht, John Fred, to Colgate-Palmolive Company. Aqueous cosmetic composition containing amine oxides. 4,048,338. Cl. 424-358.000.
Gerhardt, Hans-Joachim: *See—*
Kramer, Carl; and Gerhardt, Hans-Joachim, 4,047,521, Cl. 128-2.080.
Gerlach, Robert L.; and Palmberg, Paul W., to Physical Electronics Industries, Inc. Scanning auger microprobe with variable axial aperture. 4,048,498, Cl. 250-305.000.
Germer, John A., to Budd Company, The. Phase change means for a power driven device, such as a fan. 4,047,836, Cl. 416-39.000.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Fritzsche, Gerhard, 4,048,497, Cl. 250-303.000.
Gesellschaft fur Molekularbiologische Forschung mbH: *See—*
Wagner, Fritz; and Sahm, Hermann, 4,048,013, Cl. 195-49.000.
Ghisler, Walter, to L.M. Ericsson Pty. Ltd. Method for through connection check in digital data system. 4,048,445, Cl. 179-15.0BF.
Giampapa, Vincent C. Phonostethoscope conversion unit for amplification and clarification of corporeal sounds. 4,048,444, Cl. 179-1.0ST.
Giannetti, Carlo. Light operated target shooting systems. 4,048,489, Cl. 240-6.410.
Gibbons, John P.; and Wondolowski, Lawrence, to CPC International Inc. Process for producing carbohydrate-phenol condensation resins. 4,048,126, Cl. 260-17.200.
Gibbons, John P.; and Wondolowski, Lawrence, to CPC International Inc. Carbohydrate-based condensation resin. 4,048,127, Cl. 260-17.200.
Gibson, Robert Cameron: *See—*
Larson, Jay Michael; Clark, Ian Sidney Rex; and Gibson, Robert Cameron, 4,047,933, Cl. 75-.50C.
Gietzen, James J., to Dynamic Instrument Corporation. Electrical connector. 4,047,786, Cl. 339-154.00A.
Gillette Company, The: *See—*
Francis, John Frederick, 4,047,295, Cl. 30-40.200.
Gilliland, James L.; and Kendrick, Frank B., to Joy Manufacturing Comapny. Mining machine with cutter drum having internal drive motors. 4,047,763, Cl. 299-76.000.
Giroward, Kermit: *See—*
Hansen, Elwood F.; Goldberg, Arnold; Zenzie, Henry; and Giroward, Kermit, 4,047,914, Cl. 55-488.000.
Gjessing, Einar Tandberg. Friction type ergometer apparatus. 4,047,715, Cl. 272-132.000.
Glaesel, Gottfried, to Hego Electric GmbH. Electrical distributor blocks. 4,047,789, Cl. 339-198.00H.
Glaesener, Ernest, to Arbed - Acierles Reunies de Burbach-Eich-Dudelange S.A. End assembly for roadway guard rail. 4,047,701, Cl. 256-13.100.
Glang, Reinhard; and Raider, Stanley Irwin, to International Business Machines Corporation. Semiconductor device having reduced surface leakage and methods of manufacture. 4,048,350, Cl. 427-93.000.
Glass, John P.: *See—*
Hollander, Edward F., Jr., 4,048,396, Cl. 429-116.000.
Glass Medic, Inc.: *See—*
McCluskey, Douglas; and Kelchner, Harley E., 4,047,863, Cl. 425-13.000.
Gleeson, Thomas Paul, Jr. Transceiver test device. 4,048,564, Cl. 325-67.000.
Glory Kogyo Kabushiki Kaisha: *See—*
Murakami, Yasuo; Ushio, Masatoshi; and Matono, Hirokuni, 4,047,364, Cl. 53-389.000.
Ono, Masato; and Nakamura, Minoru, 4,047,361, Cl. 53-212.000.
Gloskey, Carl R.; and Littman, Stanley, to M&T Chemicals Inc. Preparation of stannic oxide. 4,048,294, Cl. 423-618.000.
Goeke, Alfons: *See—*
Fangmeier, Ralf; and Goeke, Alfons, 4,047,418, Cl. 72-278.000.
Goeth, Hanns: *See—*
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.
Goldberg, Arnold: *See—*
Hansen, Elwood F.; Goldberg, Arnold; Zenzie, Henry; and Giroward, Kermit, 4,047,914, Cl. 55-488.000.
Goldberg, Howard S.; and Engeler, William E., to General Electric Company. Output circuit for charge transfer transversal filter. 4,048,525, Cl. 307-353.000.
Goldberg, Paul R., to Smith Kline Instruments, Inc. Apparatus for measuring optical density with stray light compensation. 4,047,819, Cl. 356-205.000.
Goldman, Scott D.: *See—*
Adams, Guy; and Goldman, Scott D., 4,048,541, Cl. 315-248.000.
Goldstein, Stephen L.: *See—*
Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,048,107, Cl. 260-2.5AC.
Goloff, Alexander, to Caterpillar Tractor Co. Bearing constructions. 4,047,772, Cl. 308-237.00R.
Goloff, Alexander; Barker, Noble G.; and Staebler, Paul J., to Caterpillar Tractor Co. Rotary mechanism with improved cooling. 4,047,855, Cl. 418-53.000.
Goodman, Clark. Method and apparatus for detecting metal failures in situ. 4,048,558, Cl. 324-57.00R.
Goodrich, George E.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,047,768, Cl. 308-72.000.
Goodyear Tire & Rubber Company, The: *See—*
Mowdood, Syed K., 4,048,227, Cl. 260-562.00P.
Throckmorton, Morford C., 4,048,418, Cl. 526-138.000.
Gordon, Maxwell; and Lafferty, John J., to Smith Kline & French

Laboratories. Novel N-allyl and N-propargyl benzmorphan derivatives. 4,048,178, Cl. 260-293.540.

Gordon, Melvin T., Jr. Heavy duty stanchion. 4,047,502, Cl. 119-29.000.

Gormish, Kenneth J.; Hofelt, Clarence, Jr.; Lavecchia, Silvano Anthony; and Ripley, Clarence Arthur, Jr., to General Tire & Rubber Company, The. Method and apparatus for reducing lateral force variations and overturning moment variations in pneumatic tires. 4,047,338, Cl. 51-106.00R.

Goscimski, Januariusz: *See*—
Ratajczyk, Eugeniusz; Goscimski, Januariusz; and Jedrzejewski, Adam, 4,047,305, Cl. 33-172.00R.

Gottlieb Eppinger: *See*—
Nurk, Siegfried, 4,047,401, Cl. 66-187.000.

Gould, Inc.: *See*—
Jacobs, Philip C., Jr., 4,048,610, Cl. 337-165.000.

Graham, Glen Henry: *See*—
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,048,254, Cl. 260-859.00R.
Hillier, Edward Lawrence; Graham, Glen Henry; and Eichelberger, Warren Evan, 4,048,255, Cl. 260-859.00R.

Graham, Joseph, to Minnesota Mining and Manufacturing Company. Composition based on phenolic resin, polyisocyanate, and petroleum oil. 4,048,103, Cl. 260-2.50B.

Graham, Richard: *See*—
Hoke, Jack B.; Graham, Richard; and Hoffman, Richard H., 4,047,821, Cl. 403-109.000.

Grange, Raymond A.; and Miller, Robert L., to United States Steel Corporation. Heat treatment for improving the toughness of high manganese steels. 4,047,979, Cl. 148-12.00R.

Grant, Charles P., Jr.: *See*—
Cochran, Michael J.; and Grant, Charles P., Jr., 4,048,624, Cl. 364-200.000.

Grant, Willson Barrat David. Gravity roller conveyors. 4,047,625, Cl. 214-95.00R.

Gray Tool Company: *See*—
McGee, John K., 4,047,697, Cl. 251-328.000.

Grayson, Martin: *See*—
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,048,065, Cl. 210-58.000.

Green, Charles J.: *See*—
Forsythe, Alan K.; and Green, Charles J., 4,048,455, Cl. 200-81.400.

Green, Ralph V., to Du Pont de Nemours, E. I., and Company. CO purification process. 4,048,292, Cl. 423-415.00A.

Green, Robert C.; and Dubell, Robert L., to Exxon Research and Engineering Company. Liquefaction of coal. 4,048,054, Cl. 208-8.000.

Greenberger, Joseph Irwin, to Wean United, Inc. Method and apparatus for symmetrically cooling heated workpieces. 4,047,985, Cl. 148-153.000.

Greene, Marvin, to Cities Service Company. Upgrading solid fuel-derived tars produced by short residence time low pressure hydropyrolysis. 4,048,053, Cl. 208-8.000.

Greenwald, Richard B., to Polaroid Corporation. Sulfinyl-sulfonyl alkane silver halide solvents. 4,047,954, Cl. 96-29.00R.

Greenwald, Richard B., to Polaroid Corporation. (Dialkylamino)alkyloxosulfonium alkanesulfonylmethylide silver halide solvent. 4,047,955, Cl. 96-29.00R.

Greenwood, Stewart H.: *See*—
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.

Gregg Engineering Corporation: *See*—
Gregoire, Clyde G.; Hartman, James A.; and Gregoire, Milton J., 4,047,711, Cl. 270-86.000.

Gregoire, Clyde G.; Hartman, James A.; and Gregoire, Milton J., to Gregg Engineering Corporation. Adjustable mounting for paper plow. 4,047,711, Cl. 270-86.000.

Gregoire, Milton J.: *See*—
Gregoire, Clyde G.; Hartman, James A.; and Gregoire, Milton J., 4,047,711, Cl. 270-86.000.

Gregory, Clifton, to Marvel Specialty Company. Apparatus for handling hosiery. 4,047,649, Cl. 223-43.000.

Greinacher, Ekkehard, to Th. Goldschmidt AG. Process for the enrichment of europium chloride. 4,048,026, Cl. 204-61.000.

Grendahl, Bernard Elden, to UOP Inc. Load distributing track fitting. 4,047,689, Cl. 248-503.100.

Grenier, Raymond P., to Baird-Atomic, Inc. Method and apparatus for determining the condition of a biological specimen. 4,048,501, Cl. 250-367.000.

Grenley, Dallas G.: *See*—
McMaster, Elmer L.; Grenley, Dallas G.; and Prueter, Elton D., 4,048,000, Cl. 156-304.000.

Gretz, Charles, to Nutrilite Products, Inc. Box with child resistant closure. 4,048,051, Cl. 206-1.500.

Grewe, Ferdinand: *See*—
Meiser, Werner; Buchel, Karl Heinz; Kramer, Wolfgang; and Grewe, Ferdinand, 4,048,318, Cl. 424-269.000.

Grobler, Johannes Hermanus. Apparatus for impregnating constructional elements. 4,047,497, Cl. 118-50.000.

Gronebaum, Theo, to Heinrich Kuper, Firma. Device for packaging an object in foil. 4,047,359, Cl. 53-64.000.

Gropper, Hans: *See*—
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.

Gross, Frank C., to A. B. Dick/Scott. Method for developing an electrostatic latent image on an electrophotographic film. 4,047,950, Cl. 96-1.0SD.

Grossbach, Alfred. Seat belt system for motor cars. 4,047,737, Cl. 280-745.000.

Groth, Otto, to Elektra Tailfingen Ammann & Cie. Electric switching device. 4,048,599, Cl. 335-20.000.

Gruber, Wolfgang: *See*—
Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, 4,048,414, Cl. 526-106.000.

Gruner, Ronald H., to Data General Corporation. Data processing system. 4,048,623, Cl. 364-900.000.

Grunstad, Jerome A.; and Eischens, Richard G., to Minnesota Mining and Manufacturing Company. Paper clip dispenser. 4,047,637, Cl. 221-265.000.

GTE Automatic Electric Laboratories Incorporated: *See*—
Blackburn, Tom L.; and Wisotzky, Otto G., 4,048,576, Cl. 330-29.000.

GTE Laboratories Incorporated: *See*—
Epstein, James; and Chin, Arthur Y., 4,048,401, Cl. 429-171.000.

GTE Sylvania Incorporated: *See*—
Ammann, Eugene O., 4,048,516, Cl. 307-88.300.
Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 4,048,537, Cl. 313-489.000.
Jayne, Max Leroy, 4,047,785, Cl. 339-99.00R.
Rollason, Peter H.; and Williams, James M., 4,047,424, Cl. 73-52.000.
Schrank, Martin P.; and Coppola, Richard M., 4,048,347, Cl. 427-10.000.
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Guibert, Gaetan. Device for keeping live chinchilla. 4,047,501, Cl. 119-17.000.

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Bihuniak, Peter P.; and Guile, Donald L., 4,047,966, Cl. 106-69.000.

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Chu, Joseph Y. C.; and Gunther, Wolfgang H. H., 4,047,947, Cl. 96-1.300.

Gurgiolo, Arthur E.; and Booth, Llewellyn D., to Dow Chemical Company, The. Polyhalogenated polyols and foamed polyurethanes prepared from them. 4,048,100, Cl. 260-2.5AJ.

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Fecker, Josef; and Memminger, Gustav, 4,047,398, Cl. 66-132.00R.

Gutai, Ferenc, to Dynacast International Limited. Gas nozzles for gas using appliances. 4,047,669, Cl. 239-540.000.

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Nielsen, Mogens B.; Boa, Niels Halfdan; and Jensen, Jimmy, 4,047,722, Cl. 279-19.500.

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Martin, Joachim; Haas, Ernst; and Schnoeller, Manfred, 4,048,508, Cl. 250-492.00A.

Haas, Gerhard Julius; and Herman, Edwin Bernard, to General Foods Corporation. Pet food preservation. 4,048,342, Cl. 426-129.000.

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Porret, Daniel; and Habermeier, Jurgen, 4,048,170, Cl. 260-256.40E.

Haberstroh, Markus, to G.A.O. Gesellschaft fur Automation und Organisation mbH. Apparatus for optically marking predetermined positions in a stack of documents. 4,047,472, Cl. 93-93.00D.

Hackett, David E.: *See*—
Kranc, Stanley J.; Wells, Alan W.; and Hackett, David E., 4,047,664, Cl. 239-120.000.

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Belke, William H.; Hafele, Joseph C.; Landen, Ernest W.; and Richards, Thomas J., 4,047,984, Cl. 148-152.000.

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Haferl, Peter Eduard, to RCA Corporation. Switched vertical deflection system. 4,048,544, Cl. 315-408.000.
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Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, 4,048,169, Cl. 260-251.00R.
Hafke, Carl: *See—*
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Zolzer, Karlheinz, 4,047,901, Cl. 48-86.00R.
Hafner, Emanuel R.; and Nenadal, Zdenek, to Hasler AG. Data transmission system. 4,048,446, Cl. 179-15.0AL.
Hagedorn, Floyd T.: *See—*
Oelke, Waldemar W.; and Hagedorn, Floyd T., 4,047,919, Cl. 65-273.000.
Hahn, Heinz-Dieter: *See—*
Falbe, Jurgen; and Hahn, Heinz-Dieter, 4,048,233, Cl. 260-604.0HF.
Hair, George R.: *See—*
Heffernan, William; Hair, George R.; and Nielsen, John G., 4,047,358, Cl. 53-30.00R.
Hajos, Zoltan George, to Hoffmann-La Roche Inc. Process of synthesizing substituted indanones. 4,048,195, Cl. 260-345.90S.
Hakodate Seimo Sengu Co., Ltd.: *See—*
Maruyama, Jiro, 4,047,316, Cl. 43-7.000.
Hale, Ferrell Daniel; and Crowder, Charles H., to West Point Pepperell, Inc. Laminated substrate for an offset printing blanket. 4,048,368, Cl. 428-235.000.
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Holladay, Mark; and Hall, Daryl Mattew, 4,047,727, Cl. 280-87.04A.
Hall, John Emmett, to Downs Surgical Limited. Surgical sacral anchor implant. 4,047,523, Cl. 128-69.000.
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Hall, Lester W., to Raymond Lee Organization, Inc., The, a part interest. Disk guide. 4,047,458, Cl. 83-439.000.
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Halliburton Company: *See—*
Childs, Jerry D.; and Love, Roosevelt, 4,047,567, Cl. 166-293.000.
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,047,564, Cl. 166-72.000.
Hamasu, Mituyoshi. Mattress construction. 4,047,254, Cl. 5-345.00R.
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Hough, Jerome F.; and Hamburg, Douglas R., 4,047,512, Cl. 123-122.00E.
Hamel GmbH Zwirnmaschinen: *See—*
Horstmann, Aloys; and Veltel, Reinhardt, 4,047,372, Cl. 57-34.00R.
Hames, Michael D.: *See—*
Tilley, Alec R.; and Hames, Michael D., 4,048,391, Cl. 429-104.000.
Hamm, Philip C.: *See—*
Gaertner, Van R.; and Hamm, Philip C., 4,047,927, Cl. 71-86.000.
Hammond, Raiford L.: *See—*
Rast, Gustaf J., Jr.; Barley, Thomas A.; Hammond, Raiford L.; and Ashley, James R., 4,048,568, Cl. 325-363.000.
Hanaoka, Tadashi: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, 4,048,158, Cl. 260-239.100.
Handy, Richard L.; and Hoover, James M., to Iowa State University Research Foundation, Inc. Testing device for measuring lateral pressure induced on a material by a vertical applied pressure. 4,047,425, Cl. 73-94.000.
Hanes Corporation: *See—*
King, J. Frank; and Sloan, Donald A., 4,047,272, Cl. 29-2.190.
Hannebaum, Heinz: *See—*
Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, 4,048,047, Cl. 204-270.000.
Hannerz, Kare, to ASEA Aktiebolag. Reactor fuel in the form of mixed oxide particles and a method for manufacturing such mixed oxide particles. 4,048,090, Cl. 252-301.10R.
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Hanning, Michael, 4,047,774, Cl. 312-231.000.
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Hansen, Elwood F.; Goldberg, Arnold; Zenzie, Henry; and Giroward, Kermit, to Drico Industrial Corporation. Internally supported multistage sleeve filter. 4,047,914, Cl. 55-488.000.
Hansen, Torben Christen; and Ringsholt, Thomas, to Frede Hilmar Drostholm. Structural building components and method for production on the basis of laterite. 4,048,276, Cl. 264-79.000.
Hanslik, Wilhelm, to Krauss-Maffei Aktiengesellschaft. Extruder with dual tapered screws. 4,047,705, Cl. 259-192.000.
Hanson, Robert S.; and Rigg, Ralph R., to General Motors Corporation. Refrigerator forced air condenser filter. 4,047,393, Cl. 62-428.000.
Hanson, Ronald P., to Ideal Industries, Inc. Precision small wire stripper. 4,047,297, Cl. 30-90.100.
Harari, Eliyahou, to Hughes Aircraft Company. Process for fabricating non-volatile field effect semiconductor memory structure utilizing implanted ions to induce trapping states. 4,047,974, Cl. 148-1.500.
Harbulak, Edward Paul; and Lash, Ronald J., to M&T Chemicals Inc. Stripping of electroplated nickel-iron alloys. 4,048,006, Cl. 156-664.000.
Harding, John W.; and Keller, James P., to Exxon Research and Engineering Company. Post-drawn, melt-blown webs. 4,048,364, Cl. 428-113.000.
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, to General Tire & Rubber Company, The. Preparation of solution polymers. 4,048,427, Cl. 526-337.000.
Harrer, Paul H.; and Langford, LeRoy, to Allis-Chalmers Corporation. Seed disc for an air planter. 4,047,638, Cl. 221-266.000.
Harris, Samuel C., Jr.; and Surber, William A., to General Electric Company. Buffered print control system using FIFO memory. 4,048,625, Cl. 364-900.000.
Harris, Walter R., to Westinghouse Electric Corporation. Flux corrective control apparatus for motor drives. 4,048,550, Cl. 318-356.000.
Harrison, Ian T.: *See—*
Fried, John H.; and Harrison, Ian T., 4,048,330, Cl. 424-308.000.
Harsco Corporation: *See—*
Burnham, Peter B., 4,047,258, Cl. 14-71.300.
Harshaw Chemical Company, The: *See—*
Shaw, Glen A., 4,047,537, Cl. 132-7.000.
Hart, Bernard Eaton. Jet or spray producing apparatus. 4,047,666, Cl. 239-251.000.
Hart, Darrell M.: *See—*
Fiedler, Mark A.; and Hart, Darrell M., 4,047,460, Cl. 84-422.00S.
Hart, Donald J.; Bouton, John C., Jr.; and Poppel, Eugene H., to Geometric Data Corporation. Pattern recognition system with keyboard entry for adaptive sensitivity. 4,048,616, Cl. 340-146.3ED.
Hart, Joseph J.: *See—*
Bell, Richard L.; Desmond, John D.; and Hart, Joseph J., 4,047,660, Cl. 206-620.000.
Hart Schaffner & Marx: *See—*
Cooper, Shannon L.; and Adams, Frank C., 4,047,951, Cl. 96-27.00R.
Hartel, Erwin H., to Boeing Company, The. Apparatus for shortening the strut of a pivotally retractable aircraft landing gear during gear retraction. 4,047,681, Cl. 244-102.0SS.
Hartman, James A.: *See—*
Gregoire, Clyde G.; Hartman, James A.; and Gregoire, Milton J., 4,047,711, Cl. 270-86.000.
Hartmann, Hans-Joerg: *See—*
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Hartmann, Horst, to Ernest Leitz GmbH. Method and apparatus for automatic focusing an optical system with a scanning grating. 4,048,492, Cl. 250-201.000.
Hasara, Bernard. Bridge construction method. 4,047,256, Cl. 14-1.000.
Haselwood, Donald E.; Solar, Carl M.; and Thumm, Jeffrey R., to A. C. Nielsen Company. Monitoring system for voltage tunable receivers and converters utilizing voltage comparison techniques. 4,048,562, Cl. 325-31.000.
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Komamura, Seiji; and Hashizume, Hiroyuki, 4,047,846, Cl. 417-300.000.
Hasler AG: *See—*
Hafner, Emanuel R.; and Nenadal, Zdenek, 4,048,446, Cl. 179-15.0AL.
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Haaf, Franz; Hatzmann, Guenter; Herrle, Karl; and Simak, Petr, 4,048,260, Cl. 260-884.000.
Hauck, Frederic P.; Condon, Michael E.; and Fox, Rita T., to E. R. Squibb & Sons, Inc. 4-[3-(Substituted amino)-2-hydroxypropoxy]-5,6,7,8-tetrahydro-1,6,7-naphthalenetriols. 4,048,231, Cl. 260-570.700.
Hauer, Werner: *See—*
Hochradel, Ernest; and Hauer, Werner, 4,047,677, Cl. 243-19.000.
Hauman, Dewey H., Jr., to Xerox Corporation. Rotating wick oil dispensing system. 4,047,885, Cl. 432-60.000.
Hauri, Jacques: *See—*
Charransol, Pierre; Hauri, Jacques; and Danis, Roger, 4,048,482, Cl. 235-153.0AE.
Hauser, Raimund: *See—*
Pammer, Gottfried; and Kvasnicka, Rudolf, 4,047,442, Cl. 74-194.000.
Hausssuehl, Siegfried; and Recker, Kurt, to Siemens Aktiengesellschaft. Pyroelectric non-linear optical component. 4,048,514, Cl. 307-88.300.
Havard, Jean Francois Pierre Marie; Gaschet, Michel Marceau; and Charonnat, Henri Marie Dominique, to Brissonneau et Lotz. Torque responsive device. 4,048,547, Cl. 318-488.000.
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Caumartin, Francois; Raufast, Charles; and Havas, Laszlo, 4,048,412, Cl. 526-65.000.
Havens, Allan R. Method of loading and stacking bales. 4,047,628, Cl. 214-152.000.
Hawrylenko, Alexander, to Infors AG. Shaking machine comprising at least supports for the treated matter. 4,047,704, Cl. 259-1.00R.
Hay, Allan S.; and White, Dwain M., to General Electric Company. Process for capping polyphenylene oxide. 4,048,143, Cl. 260-47.0ET.
Hayashi, Hideo: *See—*
Tsuchiya, Shozo; Hayashi, Hideo; and Oshima, Akio, 4,048,132, Cl. 260-33.6UA.
Hayashi, Takashi, to Tanno Senshoku Kogyo Co., Ltd. Printed fabric washing apparatus. 4,047,404, Cl. 68-152.000.
Hayashi, Yoshimasa: *See—*
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,047,510, Cl. 123-119.00A.

Hayes, John C., to UOP Inc. Hydrocarbon conversion with an acidic trimetallic catalytic composite. 4,048,099, Cl. 252-441.000.
Hayes, John C., to UOP Inc. Dehydrogenation method using sulfided nonacidic multimetallic catalyst. 4,048,244, Cl. 260-668.00D.
Hayes, John C.: *See—*
Pollitzer, Ernest L.; and Hayes, John C., 4,048,245, Cl. 260-668.00D.
Hazard, Robert E., to Polytop Corporation. Safety dispensing closure with movable retainer. 4,047,643, Cl. 222-153.000.
Heckman, Russell W.: *See—*
Brummett, Marshall G.; Heckman, Russell W.; Nickey, George A.; and Taylor, James E., 4,048,281, Cl. 264-230.000.
Heffernan, Robert J., to United States of America, Navy. Combustion system using dilute hydrogen peroxide. 4,047,380, Cl. 60-39.46R.
Heffernan, William; Hair, George R.; and Nielsen, John G., to International Inpak Inc. Method for forming article-holding display packages. 4,047,358, Cl. 53-30.00R.
Hefter, Murray: *See—*
Buess, Kenneth G.; and Hefter, Murray, 4,048,531, Cl. 310-49.00R.
Hego Electric GmbH: *See—*
Glaesel, Gottfried, 4,047,789, Cl. 339-198.00H.
Hehl, Karl. Die closing unit for injection molding machine. 4,047,871, Cl. 425-450.100.
Heian, Glenn A., to Allis-Chalmers Corporation. Means and method for processing cement raw materials containing fuel of high volatile content. 4,047,884, Cl. 432-21.000.
Heider, Dieter: *See—*
Stotzel, Lothar; and Heider, Dieter, 4,047,621, Cl. 214-6.0DS.
Heimbach, Paul: *See—*
Wilke, Gunther; and Heimbach, Paul, 4,048,214, Cl. 560-128.000.
Heinrich Kuper, Firma: *See—*
Gronebaum, Theo, 4,047,359, Cl. 53-64.000.
Heintz, Walter K.; and Lingscheit, James N., to Ford Motor Company. Alkali metal battery structure. 4,048,393, Cl. 429-104.000.
Heithoff, Robert B., to PPG Industries, Inc. Water cooled glass stirrer. 4,047,918, Cl. 65-179.000.
Heitmann, Glenn Alvin, to Johns-Manville Corporation. Elastomeric materials reinforced with small diameter glass fibers. 4,048,137, Cl. 260-42.150.
Held, Artur: *See—*
Winter, Wilhelm; and Held, Artur, 4,047,690, Cl. 249-66.00A.
Helix Technology Corporation: *See—*
Rose, Lawrence J., 4,048,073, Cl. 210-284.000.
Hendrie, Gardner Cox; and Crafts, Harold Springer, to Data General Corporation. CPU - I/O bus interface for a data processing system. 4,048,673, Cl. 364-200.000.
Hendriks, Adrianus A. M.; and Van Daelen, Henri-Jean G. M. Gas discharge character display tube with apertured mica plate. 4,048,538, Cl. 313-519.000.
Hendry, Seth T., to Raymond Lee Organization, Inc., The, a part interest. Method of identifying a check signer. 4,048,618, Cl. 340-146.30E.
Henkel & Cie GmbH: *See—*
Wegemund, Bernd; and Galinke, Joachim, 4,048,259, Cl. 260-881.000.
Henmi, Zenzo: *See—*
Sagawa, Masato; Sakai, Takeaki; Sasaki, Tatsuji; and Henmi, Zenzo, 4,047,982, Cl. 148-101.000.
Hentrich, Josef: *See—*
Schaffernicht, Klaus; Hentrich, Josef; Klein, Herbert; and Kuckenburg, Karl-Heinz, 4,047,915, Cl. 65-106.000.
Henzi, Beat, to Sandoz Ltd. Cationic dyes containing an optionally substituted bicyclic or polycyclic aryloxyalkyl group. 4,048,151, Cl. 260-156.000.
Hercules Incorporated: *See—*
Holt, William Gilbert, 4,047,329, Cl. 47-66.000.
Simpson, David A., 4,047,963, Cl. 96-115.00R.
Hering, Klaus: *See—*
Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.
Herman, Edwin Bernard: *See—*
Haas, Gerhard Julius; and Herman, Edwin Bernard, 4,048,342, Cl. 426-129.000.
Hermann Berstorff Maschinenbau GmbH: *See—*
Bertram, Jurgen; Brand, Wilhelm; and Schaeffer, Hans-Joachim, 4,047,671, Cl. 241-66.000.
Hermann, Hans, to Dual Gebruder Steidinger. Drive device with belt and stepped speed pulley. 4,047,721, Cl. 274-9.00A.
Hermans, Johny C., to s.a. Texaco Belgium n.v. Novel polyureas prepared by reaction of a diamine with a diisocyanate or a diisothiocyanate. 4,048,106, Cl. 260-2.5AV.
Hermes, Julius, to Martin Processing, Inc. Process for the rapid, continuous and waterless dyeing of textile and plastic materials. 4,047,889, Cl. 8-93.000.
Heron, John R.: *See—*
Rechtsteiner, Steve A.; Nelson, Philip E.; and Heron, John R., 4,047,547, Cl. 141-1.000.
Herrle, Karl: *See—*
Haaf, Franz; Hatzmann, Guenter; Herrle, Karl; and Simak, Petr, 4,048,260, Cl. 260-884.000.
Heslam, Robin Snell, to Lever Bros. Co. Preparation of detergent compositions. 4,048,085, Cl. 252-102.000.
Hess, Howard V.: *See—*
Cole, Edward L.; Hess, Howard V.; and Wong, James, Jr., 4,047,898, Cl. 44-1.00G.
Hesse, Wolfgang; Ritz, Jurgen; and Teschner, Eckart, to Hoechst Aktiengesellschaft. Process for the production of abrasives. 4,047,903, Cl. 51-298.00R.
Hessert, James E.: *See—*
Clampitt, Richard L.; and Hessert, James E., 4,048,079, Cl. 252-8.55D.
Hevesi, Laszlo: *See—*
Krief, Alain; and Hevesi, Laszlo, 4,048,215, Cl. 560-124.000.
Hewlett-Packard Company: *See—*
Csaki, Julius A., 4,047,778, Cl. 316-18.000.
Shinn, Charles E., II, 4,048,577, Cl. 330-30.00D.
Heymes, Pierre Rene; and Pelzer, Rudolf, to Saint-Gobain Industries. Apparatus for the manufacture of plastics film by casting on a floating glass ribbon. 4,047,917, Cl. 65-146.000.
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Higuchi, Yositaka: *See—*
Takahashi, Kihei; and Higuchi, Yositaka, 4,047,264, Cl. 24-205.11R.
Hill, David George: *See—*
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,048,175, Cl. 260-283.00S.
Hill, Russell J.; and Tsujimoto, Kazumi N., to Airco, Inc. Compact rotary evaporation source. 4,048,462, Cl. 219-121.0EB.
Hille, Martin: *See—*
Engelhardt, Friedrich; Hille, Martin; and Ulmschneider, Dieter, 4,048,077, Cl. 252-8.50C.
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Hillman, Ernest C. Child-proof container for medicines and the like. 4,048,050, Cl. 206-1.500.
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Hinooka, Nobuya: *See—*
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.
Hinson, David C.; Bode, Wolfgang W.; Fein, Michael E.; and Hoehn, H. Joseph, to Owens-Illinois, Inc. Phosphor overcoat. 4,048,533, Cl. 313-188.000.
Hiratake, Susumu; and Matsui, Mitsuhiro, to Daidotokushuko-Kabushikikaisha. Heat treating. 4,048,436, Cl. 13-2.00P.
Hirayama, Shinichi: *See—*
Ooba, Seiichi; and Hirayama, Shinichi, 4,048,253, Cl. 260-858.000.
Hirosawa, Katsu: *See—*
Tamura, Yukio; Hirosawa, Katsu; and Ogaki, Koji, 4,047,387, Cl. 61-13.000.
Hirs, Gene, to Amsted Industries, Inc. Method of and apparatus for filtering. 4,048,068, Cl. 210-80.000.
Hirschi, Ronald G.: *See—*
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.
Hitachi Cable, Ltd.: *See—*
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, 4,047,556, Cl. 164-57.000.
Hitachi Chemical Company, Ltd.: *See—*
Urakawa, Masaharu; and Sumiyama, Hiroshi, 4,048,014, Cl. 195-66.00B.
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Ihara, Takashi, 4,048,582, Cl. 331-16.000.
Kimura, Hiroshi, 4,048,578, Cl. 330-31.000.
Murasawa, Kengo, 4,048,585, Cl. 331-94.50C.
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Hoashi, Kenzo; and Inaba, Nobuaki, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic circuit for steering control in articulate vehicles. 4,047,590, Cl. 180-139.000.
Hobbs, Albert M., Jr.: *See—*
Bennett, Moreland P.; and Hobbs, Albert M., Jr., 4,048,460, Cl. 219-91.000.
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Noguchi, Masaaki; Sumiyoshi, Masaharu; and Hobo, Nobuhito, 4,047,507, Cl. 123-32.0Ea.
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Hochtemperatur-Reaktorbau GmbH: *See—*
Haferkamp, Dirk; Hodzic, Alija; Paetz, Eike; and Stach, Heinrich, 4,047,742, Cl. 285-187.000.
Hodzic, Alija: *See—*
Haferkamp, Dirk; Hodzic, Alija; Paetz, Eike; and Stach, Heinrich, 4,047,742, Cl. 285-187.000.
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Albrecht, Konrad; Langeluddeke, Peter; Schumacher, Hans; and Schwerdtle, Friedhelm, 4,047,932, Cl. 71-108.000.
Bergmann, Rolf; Hoheisel, Klaus; Schafer, Helmut; and Unger, Manfred, 4,048,150, Cl. 260-75.00T.

Engelhardt, Friedrich; Hille, Martin; and Ulmschneider, Dieter, 4,048,077, Cl. 252-8.50C.
Hesse, Wolfgang; Ritz, Jurgen; and Teschner, Eckart, 4,047,903, Cl. 51-298.00R.
Ribka, Joachim; Rieper, Wolfgang; and Schwerin, Siegfried, 4,048,152, Cl. 260-176.000.
von der Eltz, Hans-Ulrich, 4,047,403, Cl. 68-5.00E.

Hoechst Atiengesellschaft: *See—*
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,048,185, Cl. 260-307.00D.

Hoefer Scientific Instruments: *See—*
Hoefer, Stanton A., 4,048,049, Cl. 204-299.00R.

Hoefer, Stanton A., to Hoefer Scientific Instruments. Tube gel electrophoresis device. 4,048,049, Cl. 204-299.00R.

Hoehn, H. Joseph: *See—*
Hinson, David C.; Bode, Wolfgang W.; Fein, Michael E.; and Hoehn, H. Joseph, 4,048,533, Cl. 313-188.000.

Hoehn, Hans, to E. R. Squibb & Sons, Inc. 6-Phenyl-2H-pyrazolo[3,4-b]pyridines. 4,048,184, Cl. 260-296.00H.

Hoehn, Hans: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,048,182, Cl. 260-295.50B.

Hoerner Waldorf Corporation: *See—*
Tolaas, William M., 4,048,052, Cl. 206-625.000.

Hofelt, Clarence, Jr.: *See—*
Gormish, Kenneth J.; Hofelt, Clarence, Jr.; Lavecchia, Silvano Anthony; and Ripley, Clarence Arthur, Jr., 4,047,338, Cl. 51-106.00R.

Hoffman, Ralph M. Rotary steam engine. 4,047,856, Cl. 418-61.00A.

Hoffman, Richard H.: *See—*
Hoke, Jack B.; Graham, Richard; and Hoffman, Richard H., 4,047,821, Cl. 403-109.000.

Hoffmann, Herwig: *See—*
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,048,116, Cl. 252-470.000.

Hoffmann, Kurt; Meusburger, Guenther; and Wotruba, Gottfried, to Siemens Aktiengesellschaft. Regenerator circuit for CCD elements. 4,048,519, Cl. 307-221.00D.

Hoffmann-La Roche Inc.: *See—*
Hajos, Zoltan George, 4,048,195, Cl. 260-345.90S.

Hofmann, Dieter: *See—*
Burkhardt, Gisbert; and Hofmann, Dieter, 4,047,712, Cl. 271-64.000.

Hofmann, Hans-Joachim, to Durr-Dental KG. Valve system particularly for apparatus for producing dry compressed air. 4,047,909, Cl. 55-184.000.

Hofmann, Judson A., to Zenith Radio Corporation. Variable speed horizontal automatic phase control. 4,048,655, Cl. 358-148.000.

Hogan, James W., to Xerox Corporation. Document belt with imperforate bands. 4,047,812, Cl. 355-76.000.

Hogan, Lawrence Howard: *See—*
McElwain, John Christee; and Hogan, Lawrence Howard, 4,047,396, Cl. 64-17.00A.

Hoge, A. Russell; and Myers, Robert A., to Monsanto Company. Process for refrigerator construction. 4,048,274, Cl. 264-46.500.

Hogendobler, Richard Shure: *See—*
Forney, Edgar Wilmot, Jr.; and Hogendobler, Richard Shure, 4,047,788, Cl. 339-177.00R.

Hoheisel, Klaus: *See—*
Bergmann, Rolf; Hoheisel, Klaus; Schafer, Helmut; and Unger, Manfred, 4,048,150, Cl. 260-75.00T.

Hoke, Jack B.; Graham, Richard; and Hoffman, Richard H., to A. B. Chance Company. Break-resistant telescoping tool. 4,047,821, Cl. 403-109.000.

Holbrook, Stanley E.: *See—*
Baird, William G., Jr.; Holbrook, Stanley E.; and Platt, Jeremy A., 4,048,428, Cl. 526-343.000.

Holladay, Mark; and Hall, Daryl Mattew. Skateboard roller wheel assembly. 4,047,727, Cl. 280-87.04A.

Holland Company: *See—*
Chierici, Osvaldo F., 4,047,619, Cl. 213-166.000.

Hollander, Edward F., Jr., to Glass, John P. Battery package. 4,048,396, Cl. 429-116.000.

Hollingsworth Solderless Terminal Company: *See—*
Trank, Robert D., 4,047,784, Cl. 339-98.000.

Holme, Bent Melchior Karlsen, to Pedershaab Maskinfabrik A/S. Supporting ring for use in the casting of concrete pipes. 4,047,693, Cl. 249-187.00R.

Holmes Protection Inc.: *See—*
Conklin, Robert M.; and Human, Arthur T., 4,048,621, Cl. 340-168.00B.

Holmgren, Marvin E., to Elkhart Products Corporation. Method of making a pipe fitting and product. 4,047,412, Cl. 72-58.000.

Holt, Jeremy Bruce: *See—*
Pryce-Jones, Alan, 4,048,273, Cl. 264-46.500.

Holt, William Gilbert, to Hercules Incorporated. Dual purpose container. 4,047,329, Cl. 47-66.000.

Holub, James Stephen: *See—*
Keisling, Nelson Woodrow, 4,047,322, Cl. 46-1.00R.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Maruyama, Iwao; and Kanai, Shigeo, 4,047,426, Cl. 73-118.000.
Takahashi, Noriyuki; and Miura, Kimio, 4,047,728, Cl. 180-141.000.

Honeywell Inc.: *See—*
Garoutte, Kurt F., 4,048,392, Cl. 429-105.000.

Honeywell Information Systems Inc.: *See—*
Bailey, Myrl Kennedy, Jr.; and Barlow, George J., 4,048,481, Cl. 235-153.0AK.
Fett, Darrell L., 4,048,626, Cl. 340-173.00R.

Honeywell Information Systems Italia: *See—*
Lia, Bruno; and Vigini, Giorgio, 4,048,665, Cl. 361-152.000.

Honsel Werke Aktiengesellschaft: *See—*
Kotthoff, Winfried; and Wiedenroth, Wolfgang, 4,047,558, Cl. 164-309.000.

Hook, Dale L.: *See—*
Witte, Arvel B.; Broadwell, James E.; and Hook, Dale L., 4,048,586, Cl. 331-94.50D.

Hooker Chemicals & Plastics Corporation: *See—*
Eng, Jeffrey D.; Cook, Edward H., Jr.; and Figueras, Wilfredo E., 4,048,045, Cl. 204-263.000.
Quinn, Edward J., 4,048,042, Cl. 204-206.000.

Hookings, Paul H.; Wade, Harry C.; and Deijs, Phillip, to Steel Company of Canada, Limited, The. Method and apparatus for expanding spiralweld pipe. 4,047,419, Cl. 72-370.000.

Hoover, James M.: *See—*
Handy, Richard L.; and Hoover, James M., 4,047,425, Cl. 73-94.000.

Hoover, John R. E.: *See—*
Cooper, David J.; Hoover, John R. E.; and Weisbach, Jerry A., 4,048,430, Cl. 536-17.000.

Hoover, William H. Armor structure formed from plastic laminates. 4,048,365, Cl. 428-215.000.

Hopkin, William, to Metallurgical Processes Limited; and I.S.C. Smelting Limited of London. Solvent extraction of copper with dilution of the organic phase. 4,048,282, Cl. 423-24.000.

Hopkins, P. Donald: *See—*
Menzl, Roland L.; and Hopkins, P. Donald, 4,048,094, Cl. 252-414.000.

Horgan, Anthony M., to Xerox Corporation. Composite layered imaging member for electrophotography. 4,047,948, Cl. 96-1.50R.

Horgan, Anthony M., to Xerox Corporation. Composite layered imaging member for electrophotography. 4,047,949, Cl. 96-1.50R.

Hornung, Arthur Charles. High efficiency propeller. 4,047,835, Cl. 416-23.000.

Horstmann, Aloys; and Veltel, Reinhardt, to Hamel GmbH Zwirnmaschinen. Pneumatic threader for twisting apparatus. 4,047,372, Cl. 57-34.00R.

Hortman, Norman G.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,047,564, Cl. 166-72.000.

Horton, Norman H.; and Smith, John L., to Engelhard Minerals & Chemicals Corporation. Method and system for ion-exchanging particles. 4,048,284, Cl. 423-112.000.

Hosler, Klaus: *See—*
Tax, Hans; and Hosler, Klaus, 4,047,617, Cl. 212-39.0MS.

Houdaille Industries, Inc.: *See—*
Zalis, Albert A., 4,047,858, Cl. 418-201.000.

Hougen, Everett D. Accessory support plates for a magnet base drill. 4,047,827, Cl. 408-76.000.

Hough, Harold L.: *See—*
Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 4,048,537, Cl. 313-489.000.

Hough, Jerome F.; and Hamburg, Douglas R., to Ford Motor Company. Electric fuel vaporizer. 4,047,512, Cl. 123-122.00E.

Hounsfield, Godfrey Newbold, to E M I Limited. Radiography. 4,048,505, Cl. 250-445.00T.

Howard, Frank W., III: *See—*
Johnson, Lowell E.; Cobb, Raymond P.; Howard, Frank W., III; and Dietz, Dwayne D., 4,047,383, Cl. 60-354.000.

Howarth, Thomas Trefor: *See—*
Brown, Allan Guildford; and Howarth, Thomas Trefor, 4,048,186, Cl. 260-307.0FA.

Howe, Spencer D.: *See—*
Dale, C. Harold, Jr.; Howe, Spencer D.; Bonebreak, Robert L.; and Starkus, Charles J., 4,047,792, Cl. 350-6.000.

Howlett, James W., to Howlett Machine Works. Method for coupling axially aligned tunnel sections and apparatus therefor. 4,047,388, Cl. 61-45.00R.

Howlett Machine Works: *See—*
Howlett, James W., 4,047,388, Cl. 61-45.00R.

Hramchenko, Jack; and Sibley, Murray J., to Barnes-Hind Pharmaceuticals, Inc. Abradant skin cleanser. 4,048,123, Cl. 252-545.000.

Hubbard, Howard H.; and Walsh, Thomas P., to Antennas for Communications, Inc. Method for forming a high frequency antenna. 4,047,287, Cl. 29-600.000.

Huckaby, Leonard. Hydraulic unloading and circulating device. 4,047,853, Cl. 417-434.000.

Hueber, Alfred; and Buchs, Roland, to Motoren- und Turbinen-Union Munchen GmbH. Turbine wheel having internally cooled rim and rated breaking points. 4,047,837, Cl. 416-95.000.

Hughes Aircraft Company: *See—*
Boswell, Donald D., 4,048,628, Cl. 340-173.0LM.
Brewer, George R.; and Amboss, Kurt, 4,048,534, Cl. 313-293.000.
Dale, C. Harold, Jr.; Howe, Spencer D.; Bonebreak, Robert L.; and Starkus, Charles J., 4,047,792, Cl. 350-6.000.
Harari, Eliyahou, 4,047,974, Cl. 148-1.500.
Weglein, Rolf D., 4,048,594, Cl. 333-72.000.

Hughes, Richard Swart; and Wilcox, Howard A., to United States of America, Navy. Optical integrated circuit laser beam scanner. 4,047,795, Cl. 350-96.00C.

Hughes, Robert D.: *See—*
Steigelmann, Edward F.; and Hughes, Robert D., 4,047,908, Cl. 55-158.000.

Hugon, Pierre: *See—*
Beregi, Laszlo; Hugon, Pierre; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,321, Cl. 424-274.000.

Human, Arthur T.: *See—*
Conklin, Robert M.; and Human, Arthur T., 4,048,621, Cl. 340-168.00B.

Hungerford, Daniel Comstock. Weight control calculator. 4,048,477, Cl. 235-88.00R.

Hurtig, Carl R., to Encor Limited. Toggle bolt. 4,047,462, Cl. 85-3.00R.

Hwa, Chih Ming: *See—*
Cuisia, Dionisio Guerrero; and Hwa, Chih Ming, 4,048,066, Cl. 210-58.000.

Hygroponics, Inc.: *See—*
Kehl, Donald K.; and Crist, Eugene A., 4,047,328, Cl. 47-59.000.

I.S.C. Smelting Limited of London: *See—*
Hopkin, William, 4,048,282, Cl. 423-24.000.

ICI Australia Limited: *See—*
Pollard, Leslie John; and Stewart, Donald Fergusson, 4,047,934, Cl. 75-29.000.

Ide, Fumio; and Kodama, Tsuneo, to Mitsubishi Rayon Co., Ltd. Photopolymerizable composition. 4,048,035, Cl. 204-159.150.

Ideal Industries, Inc.: *See—*
Hanson, Ronald P., 4,047,297, Cl. 30-90.100.

Igarashi, Shigemi: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,048,540, Cl. 315-241.00P.

Ihara, Takashi, to Hitachi, Ltd. Phase locked loop synthesizer. 4,048,582, Cl. 331-16.000.

Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, to Nippon Kogaku K.K.; and Sato Koki K.K. Electronic flash unit serving both as transmitter of a remote control and flash unit for flash photography. 4,048,540, Cl. 315-241.00P.

Iizuka, Yoshio: *See—*
Ishii, Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, 4,048,656, Cl. 358-261.

Illinois Tool Works Inc.: *See—*
Zirk, Robert Louis, Sr., 4,048,458, Cl. 219-10.790.

Imperial Chemical Industries Limited: *See—*
Anderson, Brian; Dalton, Raymond Frederick; and Rowbotham, Philip Martin, 4,048,187, Cl. 260-308.00D.
Bowden, Roy Dennis, 4,048,180, Cl. 260-297.00R.
Cotterrell, Graham Paul, 4,048,172, Cl. 260-256.50R.
Parry, Keith Peter; and George, Edwin Francis, 4,047,924, Cl. 71-76.000.
Roesler, Frank Cornelius, 4,048,017, Cl. 195-109.000.
Wadden, Dhafir Yusuf, 4,048,216, Cl. 260-465.300.

Inaba, Nobuaki: *See—*
Hoashi, Kenzo; and Inaba, Nobuaki, 4,047,590, Cl. 180-139.000.

Industrie Pirelli S.p.A.: *See—*
Mezzanotte, Mario, 4,047,551, Cl. 152-354.000.

Infors AG: *See—*
Hawrylenko, Alexander, 4,047,704, Cl. 259-1.00R.

Ingersoll-Rand Company: *See—*
Baker, Glen O., Jr., 4,047,595, Cl. 184-6.140.

Ingram, Woodrow Hayes, II, to Monsanto Company. Anti-migratory additive for emulsified phenolic resin systems containing a proteinaceous colloid. 4,048,125, Cl. 260-7.000.

Ingrip Fasteners, Inc.: *See—*
Brumlik, George, 4,048,371, Cl. 428-375.000.

Ino, Shiyoichi: *See—*
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, 4,047,958, Cl. 96-87.00R.

Insituform (Pipes & Structures) Ltd.: *See—*
Wood, Eric, 4,048,512, Cl. 290-53.000.

Institut Francais du Petrole: *See—*
Renault, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Dezael, Claude, 4,048,293, Cl. 423-574.00L.

Intalite International N.V.: *See—*
Mosky, George D., 4,048,278, Cl. 264-135.000.

Integrated Display Systems, Inc.: *See—*
Hanoka, Jack Isaac, 4,047,986, Cl. 148-171.000.

Intel Corporation: *See—*
Koo, James T., 4,048,518, Cl. 307-214.000.

Interdye Technology Corporation: *See—*
Paterson, James G. T.; Watkins, Charles W.; and Duckworth, Grover G., Jr., 4,047,271, Cl. 28-220.000.

International Business Machines Corporation: *See—*
Bakos, Peter; Memis, Irving; and Rasile, John, 4,048,356, Cl. 427-379.000.
Callahan, Robert William; Kauffman, Paul Eugene; and Mitchell, Matthew Joseph, Jr., 4,048,671, Cl. 364-200.000.
Dennison, James Clifford; and Ottesen, Hjalmar Holmboe, 4,048,660, Cl. 360-77.000.
Glang, Reinhard; and Raider, Stanley Irwin, 4,048,350, Cl. 427-93.000.
Nussbaumer, Henri J., 4,048,485, Cl. 235-156.000.
Vinal, Albert Watson, 4,048,648, Cl. 357-27.000.
Walsh, James Calvin; Wilson, Joseph Townsend, III; and Wolfe, Bruce Allen, 4,048,639, Cl. 346-75.000.

International Enterprises, Inc.: *See—*
Aulenbacher, Merle W., 4,047,568, Cl. 166-298.000.

International Flavors & Fragrances Inc.: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,048,201, Cl. 260-410.000.

International Harvester Company: *See—*
Bricon, Jean-Pierre Luc, 4,047,313, Cl. 37-187.000.

International Inpak Inc.: *See—*
Heffernan, William; Hair, George R.; and Nielsen, John G., 4,047,358, Cl. 53-30.00R.

International Lead Zinc Research Organization, Inc.: *See—*
Patel, Direj Vallabhbhai; and Ward, John Joseph Bernard, 4,048,024, Cl. 204-55.00R.

International Nickel Company, Inc., The: *See—*
Larson, Jay Michael; Clark, Ian Sidney Rex; and Gibson, Robert Cameron, 4,047,933, Cl. 75-.50C.

International Telephone and Telegraph Corporation: *See—*
Arnold, Bruce K.; and Moreno, Elias A., 4,047,797, Cl. 350-96.00C.
Kao, Charles Kuen; and Wolfgang, Lozure Gene, 4,047,796, Cl. 350-96.00C.

Inventa AG fur Forschung und Patentverwertung: *See—*
El-Ghatta, Hussain; and Forrer, Johann Karl, 4,048,291, Cl. 423-387.000.

Iowa State University Research Foundation, Inc.: *See—*
Handy, Richard L.; and Hoover, James M., 4,047,425, Cl. 73-94.000.

Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, to Minolta Camera Kabushiki Kaisha. Electric safety switch circuitry. 4,048,666, Cl. 361-189.000.

Isaac, Peter A. H.; and Oulton, T. Dixon, to Engelhard Minerals & Chemicals Corporation. Record sheets sensitized with reduced charge montmorillonite pigment. 4,047,738, Cl. 282-27.500.

Ishida, Minoru; and Ozeki, Shigeru, to Feather Safety Razor Company, Ltd. Two-edge shaving blade unit having anti-clogging means. 4,047,296, Cl. 30-41.000.

Ishii Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, to Fujitsu Limited. Facsimile data compression method. 4,048,656, Cl. 358-261.

Ishii, Noboru: *See—*
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, 4,047,514, Cl. 125-40.000.

Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, to Nippon Zeon Co. Ltd. Pressure sensitive adhesive. 4,048,124, Cl. 260-5.000.

Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, to Nippon Zeon Co. Ltd. Novel hydrocarbon resins and process for preparation thereof. 4,048,424, Cl. 526-237.000.

Ishikawa, Katuhiro: *See—*
Arakawa, Masatoshi; Ohno, Ryotaro; Ishikawa, Katuhiro; Yamahara, Noboru; and Matsui, Hisashi, 4,048,147, Cl. 260-67.0UA.

Ishikawa, Masaoki: *See—*
Ogawa, Masaki; Furutsuka, Takashi; and Ishikawa, Masaoki, 4,048,646, Cl. 357-15.000.

Israel, Mrs. Lawrence: *See—*
Close, Leo R., 4,047,410, Cl. 70-401.000.

Itagaki, Yasuhiko: *See—*
Sugita, Yasunori; and Itagaki, Yasuhiko, 4,048,409, Cl. 526-5.000.

Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, to UBE Industries, Ltd. 2,3,3',4'-Biphenyltetracarboxylic acid dianhydride. 4,048,197, Cl. 260-346.300.

Ito, Hajime; Yamanaka, Teruo; and Ozeki, Osamu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Alarm system for emergency braking. 4,048,613, Cl. 340-53.000.

ITT Industries, Inc.: *See—*
Bleckmann, Hans-Wilhelm, 4,047,766, Cl. 303-97.000.

Ittel, Jean-Michel: *See—*
Barbier, Daniel; Ittel, Jean-Michel; and Poujois, Robert, 4,048,574, Cl. 330-9.000.

Ivy, John B.: *See—*
Boozalis, Theodore S.; Cragar, Darryl E.; Ivy, John B.; and Willis, Gordon G., 4,048,241, Cl. 260-658.00R.

Iwaki Co., Ltd.: *See—*
Oikawa, Kunihiro, 4,047,847, Cl. 417-370.000.

Iwata, Fumio: *See—*
Nagai, Shigeki; Iwata, Fumio; and Kubo, Kenzi, 4,048,236, Cl. 260-613.00D.

Iwata, Riso: *See—*
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,124, Cl. 260-5.000.
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,424, Cl. 526-237.000.

Izawa, Takeshi. Device for interconnecting curtain rods. 4,047,262, Cl. 16-96.00D.

Izumi, Masahiko. Koji making method. 4,048,340, Cl. 426-46.000.

J. Bobst & Fils S.A.: *See—*
Lang, Pierre, 4,047,474, Cl. 93-36.00A.

J. I. Case Company: *See—*
Kuester, Donald A., 4,047,618, Cl. 212-58.00R.

J. M. Huber Corporation: *See—*
Kunkle, Albert C., 4,048,038, Cl. 204-180.00R.

Jacob, Solomon M.: *See—*
Garwood, William E.; Jacob, Solomon M.; Kuo, James C.; and Wise, John J., 4,048,250, Cl. 260-683.430.

Jacobs, David R.: *See—*
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,047,491, Cl. 112-79.00A.

Jacobs, Philip C., Jr., to Gould, Inc. Electric protective device and process of manufacturing the same. 4,048,610, Cl. 337-165.000.

Jacobson, Charles L., to Xerox Corporation. Frequency doubler. 4,048,571, Cl. 328-20.000.

Jacobson, Gunnar: *See—*
Fredriksson, Lars Evert; Jacobson, Gunnar; and Olsson, Olof Bertil, 4,047,464, Cl. 89-1.811.

Jacobsson, Kurt Arne Gunnar, to Aktiebolaget IRO. Thread storing and feeding device. 4,047,675, Cl. 242-47.010.

Jacomini, Omar J., to Westinghouse Electric Corporation. Radar system for detecting slowly moving targets. 4,048,637, Cl. 343-7.700.

Jadot, Jean Pierre: *See—*
Challeton, Didier; Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,047,801, Cl. 350-96.0WG.

Jakusch, Helmut: *See—*
Loewenberg, Gustav; Hartmann, Hans-Joerg; Schaefer, Dieter; Motz, Herbert; and Jakusch, Helmut, 4,048,375, Cl. 428-474.000.

Janecek, George. Pet waste disposal device. 4,047,499, Cl. 119-1.000.

Janne, Jouko. Machine for forming a Bismarck chain. 4,047,378, Cl. 59-20.000.

Jansen, Harvey B., to Garrett Corporation, The. Method and apparatus for closed loop acceleration control for vehicles. 4,047,589, Cl. 180-108.000.

Japan Jewel Company Limited: *See—*
Shibanai, Ichiro; and Tanabe, Shoji, 4,048,359, Cl. 428-1.000.

Japan Medical Supply Co., Ltd.: *See—*
Kurata, Motoji, 4,047,563, Cl. 165-158.000.

Japan Synthetic Rubber Co., Ltd.: *See—*
Arakawa, Masatoshi; Ohno, Ryotaro; Ishikawa, Katuhiro; Yamahara, Noboru; and Matsui, Hisashi, 4,048,147, Cl. 260-67.0UA.

Jarowenko, Wadym: *See—*
Rutenberg, Morton W.; Jarowenko, Wadym; and Tessler, Martin M., 4,048,435, Cl. 536-106.000.

Jasper, Marilyn A.: *See—*
Cox, John T.; Garber, Michael B.; Jasper, Marilyn A.; and LoVecchio, Paul, 4,048,535, Cl. 313-367.000.

Jaster, Heinz; and Staub, Fred W., to General Electric Company. Cooling liquid de-gassing system. 4,047,561, Cl. 165-32.000.

Jaster, Heinz: *See—*
Staub, Fred W.; and Jaster, Heinz, 4,048,603, Cl. 336-57.000.

Jayne, Max Leroy, to GTE Sylvania Incorporated. Electrical connector, assembly, and contact. 4,047,785, Cl. 339-99.00R.

Jedrzejewski, Adam: *See—*
Ratajczyk, Eugeniusz; Goscimski, Januariusz; and Jedrzejewski, Adam, 4,047,305, Cl. 33-172.00R.

Jeffrey, Joseph O., to Borg-Warner Corporation. Synchronous belt and pulley drive. 4,047,444, Cl. 74-229.000.

Jenaer Glaswerk, Schott & Gen.: *See—*
Kriege, Wolfgang, 4,048,486, Cl. 240-1.00R.

Jenkins, David Conwil: *See—*
Berg, Samuel Sidney; Jenkins, David Conwil; and Phillipson, Ronald Frederick, 4,048,326, Cl. 424-300.000.

Jensen, Jimmy: *See—*
Nielsen, Mogens B.; Boa, Niels Halfdan; and Jensen, Jimmy, 4,047,722, Cl. 279-19.500.

Jensen, Johannes Tejlgaard: *See—*
Bruel, Per Wilhelm; Schioler, Holger; and Jensen, Johannes Tejlgaard, 4,047,516, Cl. 126-270.000.

Jidai, Eiki; Ono, Hiroshi; and Shibayama, Kyoichi, to Mitsubishi Denki Kabushiki Kaisha. Water-dispersion varnish for electrodeposition. 4,048,379, Cl. 428-500.000.

Jinnai, Toshio: *See—*
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 4,047,803, Cl. 350-160.0LC.

Johann Wolf Gesellschaft m.b.H. KG.: *See—*
Wolf, Johann, 4,047,691, Cl. 249-97.000.

John, Heinz, to Lindauer Dornier Gesellschaft mbH. Apparatus for separating objects. 4,047,270, Cl. 28-205.000.

John Wyeth & Brother Limited: *See—*
Black, Robin Michael, 4,048,177, Cl. 260-288.00R.
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,048,175, Cl. 260-283.00S.

Johns, Eddie D.; Cummings, Robert E.; and Pearl, Edgar W. Lock mechanism. 4,047,408, Cl. 70-129.000.

Johns-Manville Corporation: *See—*
Aguilar, Manuel, Jr., 4,047,349, Cl. 52-551.000.
Heitmann, Glenn Alvin, 4,048,137, Cl. 260-42.150.
McSweeney, Diarmuid Justin, 4,047,348, Cl. 52-484.000.
Miga, Christian John, 4,048,138, Cl. 260-42.370.
Oser, Nathan; and Niedzinski, Edmund John, 4,047,417, Cl. 72-185.000.

Johnson, Charles E. Method for controlling allergens. 4,048,369, Cl. 428-262.000.

Johnson Controls, Inc.: *See—*
Matthews, Russell Byron, 4,047,878, Cl. 431-22.000.

Johnson, Cordell E.: *See—*
Armanini, Louis; and Johnson, Cordell E., 4,047,969, Cl. 106-291.000.

Johnson, David Lee: *See—*
Alderete, William Eugene; Boyer, John Parke; Daugherty, Kenneth Earl; and Johnson, David Lee, 4,047,961, Cl. 106-89.000.

Johnson, Donald S.; and Williams, Frank J., III, to General Electric Company. Preparation of bisphenol-A bisimides. 4,048,190, Cl. 260-326.00N.

Johnson, Edgar A.; and Myers, Bruce L., to Singer Company, The. Broad band microwave receiver gain calibrator. 4,048,567, Cl. 325-363.000.

Johnson, Kenneth C., to F. J. Littell Machine Company. Uncoiling and straightening apparatus for strip material. 4,047,416, Cl. 72-183.000.

Johnson, Lowell E.; Cobb, Raymond P.; Howard, Frank W., III; and Dietz, Dwayne D., to Caterpillar Tractor Co. Torque converter with variable stator. 4,047,383, Cl. 60-354.000.

Johnston, John W.: *See—*
Sieber, Charles W.; Knutson, Richard K.; and Johnston, John W., 4,047,592, Cl. 181-142.000.

Johrde, Paul S.: *See—*
Zona, Michael R.; Ruffing, Charles R.; and Johrde, Paul S., 4,047,867, Cl. 425-117.000.

Jonda, Wolfgang, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Low-weight dent-resistant structure and method for production thereof. 4,048,360, Cl. 428-35.000.

Jones, Frank N., to Du Pont de Nemours, E. I., and Company. Polymeric materials with silane end groups. 4,048,207, Cl. 260-448.80R.

Joy Manufacturing Comapny: *See—*
Gilliland, James L.; and Kendrick, Frank B., 4,047,763, Cl. 299-76.000.

Julia, Marc: *See—*
Chabardes, Pierre; Julia, Marc; and Menet, Albert, 4,048,234, Cl. 260-607.0AR.

Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, to Automated Building Components, Inc. Method of joining wooden members. 4,047,282, Cl. 29-432.000.

Jursa, Stephen J. D.: *See—*
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Jursa, Stephen J. D., 4,047,916, Cl. 65-106.000.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Voigt, Hermann Uwe, 4,048,129, Cl. 260-23.00H.

Kabushiki Kaisha Daini Seikosha: *See—*
Miwa, Akihoro; and Misono, Shigemi, 4,048,478, Cl. 235-92.00T.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Hoashi, Kenzo; and Inaba, Nobuaki, 4,047,590, Cl. 180-139.000.
Tamura, Yukio; Hirosawa, Katsu; and Ogaki, Koji, 4,047,387, Cl. 61-13.000.

Kabushiki Kaisha Suwa Seikosha: *See—*
Shindo, Takemasa; and Arai, Kenichiro, 4,048,470, Cl. 219-216.000.

Kachik, Robert H.: *See—*
Pignocco, Arthur J.; and Kachik, Robert H., 4,048,352, Cl. 427-234.000.

Kackstadter, Klaus; and Theidel, Hans, to Bayer Aktiengesellschaft. Whitening of polyester fibers. 4,047,887, Cl. 8-1.00W.

Kahlhofer, Reiner: *See—*
Lorenz, Horst; Koch, Rolf Eckart; and Kahlhofer, Reiner, 4,047,470, Cl. 90-15.00R.

Kahr, Kurt: *See—*
Weitz, Hans-Martin; Kahr, Kurt; and Fischer, Rolf, 4,048,165, Cl. 544-166.000.

Kaiser, Carl: *See—*
Colella, Donald F.; and Kaiser, Carl, 4,048,229, Cl. 260-570.600.

Kajima Corporation: *See—*
Yahiro, Teruo; and Yoshida, Hiroshi, 4,047,580, Cl. 175-67.000.

Kakeya, Nobuharu: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, 4,048,158, Cl. 260-239.100.

Kalab, Frantisek: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.

Kaltenbach & Voigt: *See—*
Eibofner, Eugen, 4,047,301, Cl. 32-27.000.

Kamatics Corporation: *See—*
Orkin, Stanley S.; and Nagy, Edward John, 4,048,370, Cl. 428-323.000.

Kamp, Heinz, to W. Schlafhorst & Co. Device for adjusting a retrograde rotary motion in a coil. 4,047,674, Cl. 242-18.0DD.

Kanai, Shigeo: *See—*
Maruyama, Iwao; and Kanai, Shigeo, 4,047,426, Cl. 73-118.000.

Kaniut, Herbert M. Swingtail for spacecraft and for fast aircraft. 4,047,680, Cl. 244-87.000.

Kantlehner, Willi: *See—*
Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, 4,048,315, Cl. 424-249.000.

Kanzelberger, James C., to Contemporary, Inc. Plastic plates adapted to be imprinted and methods of manufacturing and imprinting on plastic plates. 4,047,996, Cl. 156-220.000.

Kao, Charles Kuen; and Wolfgang, Lozure Gene, to International Telephone and Telegraph Corporation. Precision optical fiber connector. 4,047,796, Cl. 350-96.00C.

Kapaan, Hendrikus Jan: *See—*
Korenhof, Abraham; and Kapaan, Hendrikus Jan, 4,047,770, Cl. 308-191.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Disposable diaper with retaining and securing fastener. 4,047,528, Cl. 128-287.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Disposable diaper with unitary tape fastener. 4,047,529, Cl. 128-287.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Disposable diaper with fastener retained end barrier. 4,047,530, Cl. 128-287.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Absorbent article with differential pad. 4,047,531, Cl. 128-290.00R.

Karl Schmidt GmbH: *See—*
Noack, Wolfgang-Hermann, 4,047,471, Cl. 92-187.000.

Karlsson, Hugo. Device on pressing piston. 4,047,872, Cl. 425-469.000.

Karner, Kenneth E.: *See—*
Bowler, John W.; Karner, Kenneth E.; Pittenger, Daniel I.; and Schwartz, Donald A., 4,048,669, Cl. 361-391.000.

Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, to Richter Gedeon Vegyeszeti Gyar Rt. Bronchially effective xanthene-9-carboxylates. 4,048,322, Cl. 424-283.000.

Karpov, Valentin Mikhailovich; Santo, Vladimir Rezhevich; Yanovsky, Viktor Yakovlevich; Mikhailov, Anatoly Ivanovich; and Belyaev, Mikhail Fedorovich. Force measuring transducer with frequency output signal. 4,047,428, Cl. 73-141.00A.

Karrer, Friedrich, to Ciba-Geigy Corporation. Propenyloxy benzene compounds. 4,048,235, Cl. 260-612.00R.

Karrer, Friedrich, to Ciba-Geigy Corporation. (4-Phenoxyphenoxy)alkyl cyclopropanecarboxylates. 4,048,327, Cl. 424-305.000.

Karst, Karl A.; and Sowman, Harold G., to Minnesota Mining and Manufacturing Company. Non-frangible alumina-silica fibers. 4,047,965, Cl. 106-65.000.

Kashima, Mikito: *See—*
Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, 4,048,197, Cl. 260-346.300.

Katayama, Shigenari: *See—*
Yamamoto, Michihiro; Katayama, Shigenari; Koshiba, Masao; and Yamamoto, Hisao, 4,048,168, Cl. 260-251.0QB.

Kato, Osamu: *See—*
Tanaka, Hiroshi; and Kato, Osamu, 4,047,897, Cl. 428-539.500.

Katz, Saul Norman, to General Foods Corporation. Coffee percolation process. 4,048,345, Cl. 426-432.000.

Kauffman, Paul Eugene: *See—*
Callahan, Robert William; Kauffman, Paul Eugene; and Mitchell, Matthew Joseph, Jr., 4,048,671, Cl. 364-200.000.

Kaufman, George A., Jr., to Superior Electric Company, The. Electric motor with plastic encapsulated stator. 4,048,530, Cl. 310-89.000.

Kawahara, Yasuhito: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,048,540, Cl. 315-241.00P.

Kawamura Institute of Chemical Research: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.

Kawasaki Motors Corporation U.S.A.: *See—*
Blass, Jaroslav, 4,047,588, Cl. 180-64.00R.

Kawazoe, Michio. Coupling device in a stroboscope holder with a removable bracket. 4,048,488, Cl. 240-1.300.

Kayabakogyokabushikikaisha: *See—*
Komamura, Seiji; and Hashizume, Hiroyuki, 4,047,846, Cl. 417-300.000.

Keats, Albert Brian, to United Kingdom Atomic Energy Authority. Data handling systems. 4,048,483, Cl. 235-153.00A.

Keeling and Walker, Limited: *See—*
Morriss, Harry Augustus; and Williamson, John Peter Hugh, 4,047,970, Cl. 106-299.000.

Kehl, Donald K.; and Crist, Eugene A., to Hygroponics, Inc. Greenhouse. 4,047,328, Cl. 47-59.000.

Keisling, Nelson Woodrow, to Holub, James Stephen; and LaSalle, Robert James, part interest to each. Amusement device of pictorial display. 4,047,322, Cl. 46-1.00R.

Keith, Charles Herbert, to Celanese Corporation. Cellulose ester fibrillar structure. 4,047,862, Cl. 425-8.000.

Keith, John L., to Rockwell International Corporation. Temperature measuring apparatus. 4,047,435, Cl. 73-362.0SC.

Kelbel, Donald William: *See—*
Fogelberg, Mark John; and Kelbel, Donald William, 4,047,601, Cl. 192-36.000.

Kelchner, Harley E.: *See—*
McCluskey, Douglas; and Kelchner, Harley E., 4,047,863, Cl. 425-13.000.

Kelleher, Raymond L.; Shirk, Ivan A.; and O'Leary, Timothy J., deceased, to Corporation of Gonzaga University, The. Sulfur recovery method. 4,048,287, Cl. 423-242.000.

Keller, James P.: *See—*
Harding, John W.; and Keller, James P., 4,048,364, Cl. 428-113.000.

Kelley, Charles S. Automatic grab bucket with pressure responsive solenoid control. 4,047,311, Cl. 37-54.000.

Kelley, Don Howard: *See—*
Quock, Billy; Kelley, Don Howard; and Warneke, Sehon Lester, 4,048,102, Cl. 260-2.5AM.

Kellogg, Richard Webster, to Boeing Company, The. Mechanical counterbalance assembly. 4,047,441, Cl. 74-52.000.

Kelly, Robert C., to Upjohn Company, The. Process for bicyclic lactone dials. 4,048,193, Cl. 260-343.30R.

Kelsen, Arthur F. Oral syringe. 4,047,527, Cl. 128-229.000.

Kendrick, Frank B.: *See—*
Gilliland, James L.; and Kendrick, Frank B., 4,047,763, Cl. 299-76.000.

Kennecott Copper Corporation: *See—*
Rappas, Alkis S.; and Pemsler, J. Paul, 4,047,940, Cl. 75-108.000.

Kent, Frederick M.: *See—*
Eichelberger, James W.; Kent, Frederick M.; and Sokol, Michael, 4,047,890, Cl. 23-230.00B.

Kerr, Michael W., to Shell Oil Company. Method of sterilizing male anthers. 4,047,930, Cl. 71-95.000.

Kerry, John C.: *See—*
Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

Kervizic, Jean; Deslandes, Claude; and Berson, Alain, to Etat Francais. Electronic igniter circuit for detonating an electric primer. 4,047,482, Cl. 102-19.200.

Keske, Robert G.; Poppe, Wassily W.; and Fielding, Ivor R., to Standard Oil Company (Indiana). Polyoxyethylene alkyl ether additives in impact resistant compositions of polypropylene. 4,048,131, Cl. 260-33.20R.

Kesting, Robert E., to Chemical Systems, Inc. Dry process for forming polycarbonate membranes. 4,048,271, Cl. 264-41.000.

Keszei, Jeno: *See—*
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

Kewley, Norman E., to General Electric Company. Last-flash indicator switch in photoflash array. 4,048,487, Cl. 240-1.300.

Khramov, Dmitry Alexandrovich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.

Kiefer, James E. Flotation hiking harness. 4,047,255, Cl. 9-337.000.

Kieffer, Vernon E., to Emerson Electric Co. Oscillating blade winding insertion device. 4,047,293, Cl. 29-736.000.

Kienzle, Jean Andre Paul, to Pechiney Ugine Kuhlmann. Lipophilic phthalocyanines. 4,048,189, Cl. 260-314.500.

Kieserling & Albrecht: *See—*
Fangmeier, Ralf; and Goeke, Alfons, 4,047,418, Cl. 72-278.000.

Kilian, Wolfgang: *See—*
Frese, Albert; Dittmann, Walter; and Kilian, Wolfgang, 4,048,419, Cl. 526-153.000.

Kimberly-Clark Corporation: *See—*
Thomaschefsky, Susan N.; and Sprangers, Ann, 4,047,534, Cl. 128-461.000.

Kimura, Hiroshi, to Hitachi, Ltd. R.F. amplifier circuit. 4,048,578, Cl. 330-31.000.

Kimura, Kazuo: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.

King, J. Frank; and Sloan, Donald A., to Hanes Corporation. Machine for continuous bias cutting of tubular fabric. 4,047,272, Cl. 29-2.190.

Kingsbury, Herbert William, to British Uralite Limited. Noise control materials. 4,048,366, Cl. 428-215.000.

Kinney Safety Systems, Inc.: *See—*
Crandall, Richard E.; and Morgan, Denny E., 4,048,620, Cl. 340-163.000.

Kirilloff, Victor V., to Mosebach Manufacturing Company. Protective circuit for dynamic braking resistors. 4,048,664, Cl. 361-89.000.

Kislig, Jurg: *See—*
Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.

Kita, Nobuyuki: *See—*
Okano, Yukio; Kita, Nobuyuki; and Uesugi, Kyozo, 4,047,807, Cl. 350-266.000.

Kitajima, Yukio: *See—*
Yoshida, Katsuyoshi; and Kitajima, Yukio, 4,047,977, Cl. 148-6.200.

Kiwi Coders Corporation: *See—*
McKay, James G., deceased; and McKay, Allen J., executor, 4,047,479, Cl. 101-36.000.

Klaiber, Erich Manfred: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,048,201, Cl. 260-410.000.

Klancnik, John H., to Afco Products Incorporated. Antenna couplings. 4,047,779, Cl. 339-9.00A.

Kleer-Vu Industries, Inc.: *See—*
Osher, Benjamin B., 4,047,315, Cl. 40-102.000.

Klein, Bernard, to Tension Envelope Corporation. Print envelope. 4,047,661, Cl. 229-70.000.

Klein, Darrel J. Spare tire hoist and support. 4,047,629, Cl. 214-451.000.

Klein, Herbert: *See—*
Schaffernicht, Klaus; Hentrich, Josef; Klein, Herbert; and Kuckenburg, Karl-Heinz, 4,047,915, Cl. 65-106.000.

Kline, Leslie F.: *See—*
Walker, James Donald; and Kline, Leslie F., 4,048,267, Cl. 261-122.000.

Knapp, Edward J., Jr., to Chase-Shawmut Company, The. Lattice structure for electric fuses comprising fusible elements and insulating supports therefor. 4,048,609, Cl. 337-159.000.

Knifton, John F., to Texaco Inc. Processes for regenerating dispersions of ligand-stabilized, palladium(II) halide complexes used in carbonylation catalysts. 4,048,093, Cl. 252-414.000.

Knight, Stanley Paul; and Molinari, Thomas Edward, to RCA Corporation. Planar printed circuit board arrangement useful in the UHF portion of a television tuner. 4,048,597, Cl. 334-15.000.

Knight, Stanley Paul, to RCA Corporation. UHF tuning circuit utilizing a varactor diode. 4,048,598, Cl. 334-15.000.

Knoble, David W.: *See—*
Owen, Daniel V.; and Knoble, David W., 4,048,543, Cl. 315-205.000.

Knollmueller, Karl O., to Olin Corporation. Functional fluid systems containing alkoxysilanol cluster compounds. 4,048,083, Cl. 252-78.300.

Knollmueller, Karl O., to Olin Corporation. Functional fluid systems containing alkoxysilane cluster compounds. 4,048,084, Cl. 252-78.300.

Knorr, William L., to Studco, Inc. Shaftwall. 4,047,355, Cl. 52-738.000.

Knox, Betty C.; and Schneider, Sally W. Page keeper. 4,047,688, Cl. 248-451.000.

Knox, Robert M.; and Toulios, Peter P., to Epsilon Lambda Electronics Corporation. Receiver module and components thereof. 4,048,589, Cl. 331-107.00R.

Knuppel, Helmut; Brotzmann, Karl; and Fassbinder, Hans Georg, to Eisenwerk-Gesellschaft Maximilianshutte mbH. Process and converter for refining liquid metals. 4,047,707, Cl. 266-222.000.

Knuth, Kurt E., to Teletype Corporation. Method and apparatus for synchronizing a facsimile transmission. 4,048,657, Cl. 358-285.000.

Knutson, Richard K.: *See*—
Sieber, Charles W.; Knutson, Richard K.; and Johnston, John W., 4,047,592, Cl. 181-142.000.

Knutsson, Filip; and Bergstrom, Lars, to AB Svenska Flaktfabriken. Dust separator apparatus. 4,047,907, Cl. 55-147.000.

Kobayashi, Haruhiko, to Nippon Gakki Seizo Kabushiki Kaisha. Adjustable tilter device used for holding objects such as musical instruments. 4,047,684, Cl. 248-122.000.

Kobayashi, Nobuki: *See*—
Kobayashi, Sadao; Ozawa, Hiroshi; and Kobayashi, Nobuki, 4,048,136, Cl. 260-42.140.

Kobayashi, Sadao; Ozawa, Hiroshi; and Kobayashi, Nobuki, to Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chem., Inc.). Metallic tone powder coating composition. 4,048,136, Cl. 260-42.140.

Kobe, Inc.: *See*—
Erickson, John W., 4,047,581, Cl. 175-95.000.

Koberstein, Edgar; and Lakatos, Eduard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Catalyst for purification of exhaust gases and processes for its production and use. 4,048,098, Cl. 252-432.000.

Koberstein, Edgar; Muller, Klaus; and Theissen, Ferdinand, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Process for the production of 3-methylmercaptopropionaldehyde. 4,048,232, Cl. 260-601.00R.

Koch, Kenneth W.: *See*—
May, Walter R.; Zetlmeisl, Michael J.; and Koch, Kenneth W., 4,047,875, Cl. 431-3.000.

Koch, Rolf Eckart: *See*—
Lorenz, Horst; Koch, Rolf Eckart; and Kahlhofer, Reiner, 4,047,470, Cl. 90-15.00R.

Kodama, Tsuneo: *See*—
Ide, Fumio; and Kodama, Tsuneo, 4,048,035, Cl. 204-159.150.

Kohn, Armand. Fungicidal composition and method. 4,048,324, Cl. 424-294.000.

Koike, Shyouichi, to Nissan Motor Company, Limited. Roof rail weatherstrip for motor vehicle. 4,047,751, Cl. 296-146.000.

Kok, Bob; and Krause, Erhardt, to C.S.S. Container Storage Service Establishment. Apparatus for measuring the alcohol content in human breath. 4,047,893, Cl. 23-254.00E.

Kokeisl, Walter. Device for bundling skis together in pairs. 4,047,726, Cl. 280-11.37A.

Kolarik, Stanislav: *See*—
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,048,008, Cl. 162-104.000.

Kolb, Gunter: *See*—
Sackmann, Gunter; Kolb, Gunter; and Muller, Friedhelm, 4,048,422, Cl. 526-203.000.

Kolb, William A.; and Vignovich, Pete, to United States Steel Corporation. Method for controlling the operation of a steel refining converter. 4,047,937, Cl. 75-59.000.

Koller, Hans, to BUSS A.G. Apparatus for making tanks from plates. 4,047,700, Cl. 254-89.00H.

Kolm, Eric A.; and Trottier, Robert R., to Signal Science Systems, Inc. Light-activated remote control unit. 4,048,596, Cl. 334-8.000.

Komamura, Seiji; and Hashizume, Hiroyuki, to Kayabakogyokabushikikaisha. Power-steering pump. 4,047,846, Cl. 417-300.000.

Komatsu, Kensuke: *See*—
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.

Komatsu, Shigeyoshi. Process for mending clothes. 4,047,994, Cl. 156-98.000.

Kondelikova, Jaroslava: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Kondelikova, Jaroslava; Casensky, Bohuslav; and Machacek, Jiri, 4,048,421, Cl. 526-177.000.

Kondratenko, Maria Stefanova; Nachev, Lyubomir Todorov; Dedova, Petrushka Atanassova; and Antonova, Tamara Nikolaevna, to DSO "Miechna Promishlenost". Preparation of cheese with a microbial milk coagulating enzyme. 4,048,339, Cl. 426-39.000.

Koo, James T., to Intel Corporation. MOS buffer circuit. 4,048,518, Cl. 307-214.000.

Kopf, Johann, to Otto Bihler Maschinenfabrik GmbH & Co. KG. Apparatus for welding contact beads on an electrically conductive substrate. 4,048,461, Cl. 219-104.000.

Koppel, Gary A., to Eli Lilly and Company. Process for preparation of 7-alkoxy-3-bromomethylcephems. 4,048,160, Cl. 544-21.000.

Koppel, Gary A., to Eli Lilly and Company. Process for preparation of 7-alkoxy-3-chloromethylcephems. 4,048,163, Cl. 544-21.000.

Koppers Company, Inc.: *See*—
Romovacek, George R., 4,048,020, Cl. 196-132.000.
Romovacek, George R., 4,048,056, Cl. 208-41.000.

Korenhof, Abraham; and Kapaan, Hendrikus Jan, to SKF Industrial Trading and Development Company, B.V. Hub bearing unit assembly. 4,047,770, Cl. 308-191.000.

Kornrumpf, William P.: *See*—
Walker, Loren H.; and Kornrumpf, William P., 4,048,539, Cl. 315-176.000.

Koscinski, Daniel P., to Towmotor Corporation. Compact seat suspension for lift truck. 4,047,759, Cl. 297-346.000.

Koshiba, Masao: *See*—
Yamamoto, Michihiro; Katayama, Shigenari; Koshiba, Masao; and Yamamoto, Hisao, 4,048,168, Cl. 260-251.0QB.

Kosky, Philip G.: *See*—
Pomeroy, Bruce D.; and Kosky, Philip G., 4,048,529, Cl. 310-54.000.

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Kotthoff, Winfried; and Wiedenroth, Wolfgang, to Honsel Werke Aktiengesellschaft. Metering device for metal casting machines, particularly low pressure casting machines. 4,047,558, Cl. 164-309.000.

Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensick, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Functional organophosphonic acid esters as preservative adhesion promoting agents and coating for metals. 4,048,374, Cl. 428-457.000.

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Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich. Fast nuclear reactor. 4,048,011, Cl. 176-40.000.

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Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

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Spiers, Steven F.; Lewis, Howard M.; Kraft, Gerald A.; and Pasquine, Arthur R., 4,047,421, Cl. 73-1.00R.

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Eschenfelder, Gunther; and Schultz, Rudiger, 4,048,010, Cl. 176-36.00R.
Kuter, Heinrich; and Krieger, Gerhard, 4,048,532, Cl. 310-68.00D.
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Krall, Heribert A.; and Maag, Helmut, to Technica-Guss GmbH. Strand milling method. 4,047,468, Cl. 90-11.00C.

Kramer, Carl; and Gerhardt, Hans-Joachim. Rate-of-flow meter, particularly for diagnostic spirometry. 4,047,521, Cl. 128-2.080.

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Meiser, Werner; Buchel, Karl Heinz; Kramer, Wolfgang; and Grewe, Ferdinand, 4,048,318, Cl. 424-269.000.

Kramm, David E.: *See*—
Morgan, Charles R.; and Kramm, David E., 4,048,218, Cl. 560-147.000.

Kranc, Stanley J.; Wells, Alan W.; and Hackett, David E., to Caterpillar Tractor Co. Accumulator type injection valve including a dump valve for fast response. 4,047,664, Cl. 239-120.000.

Krause, Erhardt: *See*—
Kok, Bob; and Krause, Erhardt, 4,047,893, Cl. 23-254.00E.

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Hanslik, Wilhelm, 4,047,705, Cl. 259-192.000.

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Kreuzer, Lloyd B., to Diax Corporation. Infrared absorption spectroscopy of liquids employing a thermal detector. 4,048,499, Cl. 250-344.000.

Krick, Edward F.; and MacLeod, David E., to Carrier Corporation. Cabinet construction. 4,047,776, Cl. 312-245.000.

Krief, Alain; and Hevesi, Laszlo, to Roussel Ulcaf. Process for preparation of trans-chrysanthemates. 4,048,215, Cl. 560-124.000.

Kriege, Wolfgang, to Jenaer Glaswerk, Schott & Gen. Lighting device for fiber-optic systems. 4,048,486, Cl. 240-1.00R.

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Krockta, Harry, to Ducon Company, Inc., The. Apparatus for collecting fine particles. 4,047,910, Cl. 55-235.000.

Krojer, Hubert, to Dornier GmbH. Air intake with deflecting device against foreign objects impinging in the initial direction of air flow at engine nacelles. 4,047,911, Cl. 55-306.000.

Kronenberg, Marvin Lee, to Union Carbide Corporation. Non-aqueous cell having a cathode of lead monoxide-coated lead dioxide particles. 4,048,402, Cl. 429-194.000.

Kronenberg, Marvin Lee, to Union Carbide Corporation. Non-aqueous lead dioxide cell having a unipotential discharge voltage. 4,048,403, Cl. 429-194.000.

Kruger, Heinrich, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Drilling tool. 4,047,830, Cl. 408-239.00A.

Kruka, Vitold R., to Shell Oil Company. Method for establishing

core-flow in water-in-oil emulsions or dispersions. 4,047,539, Cl. 137-13.000.

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Kubela, Rudolph; and Do Nascimento, Jose Maria, to Delmar Chemicals Limited. Morpholino containing 4-arylpiperidine derivatives. 4,048,314, Cl. 424-248.550.

Kubo, Kenzi: *See—*
Nagai, Shigeki; Iwata, Fumio; and Kubo, Kenzi, 4,048,236, Cl. 260-613.00D.

Kubota, Ltd.: *See—*
Morita, Yasuji, 4,047,882, Cl. 432-9.000.

Kuckenburg, Karl-Heinz: *See—*
Schaffernicht, Klaus; Hentrich, Josef; Klein, Herbert; and Kuckenburg, Karl-Heinz, 4,047,915, Cl. 65-106.000.

Kuczynski, Robert A.: *See—*
Kuczynski, Walter J.; and Kuczynski, Robert A., 4,048,611, Cl. 337-380.000.

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Kudo, Kazuo; and Mizutani, Takashi, to Toppan Printing Co., Ltd. Multilayer parison extrusion molding machine for blow molding. 4,047,868, Cl. 425-133.100.

Kuehn, Udo, to Ervin Industries, Inc. Blast cleaning machine. 4,047,334, Cl. 51-422.000.

Kuester, Donald A., to J. I. Case Company. Crane construction and method of operation. 4,047,618, Cl. 212-58.00R.

Kugel, Wolfgang: *See—*
Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, 4,048,315, Cl. 424-249.000.

Kuhfus, Gerd: *See—*
Gumb, Beverly William; Kuhfus, Gerd; and Cogan, Frederick Thomas, 4,047,787, Cl. 339-154.00A.

Kuhl, Dieter, to Siemens Aktiengesellschaft. Removing carbon dioxide from the air. 4,047,894, Cl. 23-284.000.

Kukolja, Stjepan; and Murphy, Charles F., to Eli Lilly and Company. Process for preparing 3-hydroxy cephalosporins. 4,048,162, Cl. 544-22.000.

Kulessa, Gerhard; and Mommertz, Elmar, to Schering Aktiengesellschaft. Inhalator for agglomeratable pulverulent solids. 4,047,525, Cl. 128-208.000.

Kunert, Maximilian: *See—*
Wegner, Hans-Georg; and Kunert, Maximilian, 4,048,055, Cl. 208-25.000.

Kunkle, Albert C., to J. M. Huber Corporation. Electroflocculation cell. 4,048,038, Cl. 204-180.00R.

Kuntz, Irving, to Exxon Research and Engineering Company. Alternating elastomeric interpolymers. 4,048,425, Cl. 526-245.000.

Kunze, Dieter, to Siemens Aktiengesellschaft. Method and apparatus for connecting individual light waveguides. 4,047,283, Cl. 29-466.000.

Kuo, James C.: *See—*
Garwood, William E.; Jacob, Solomon M.; Kuo, James C.; and Wise, John J., 4,048,250, Cl. 260-683.430.

Kurata, Motoji, to Japan Medical Supply Co., Ltd. Heat exchanger for artificial heart and lung devices. 4,047,563, Cl. 165-158.000.

Kurata, Yoshio. Method of manufacturing hammer. 4,047,278, Cl. 29-424.000.

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Saito, Tsuyoshi; and Asano, Kiro, 4,048,222, Cl. 260-514.00J.
Yoshikawa, Shinsuke; Terasaki, Syuuzi; and Sasaki, Tohru, 4,047,998, Cl. 156-275.000.

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Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.

Kusakabe, Masao; Fuziwara, Shuzo; and Shiino, Kazuo, to Director-General of the Agency of Industrial Science and Technology. Underwater blasting explosives. 4,047,987, Cl. 149-37.000.

Kushner, Ben: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, 4,047,282, Cl. 29-432.000.

Kuspert, John C.: *See—*
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., 4,047,713, Cl. 271-221.000.

Kuter, Heinrich; and Krieger, Gerhard, to Kraftwerk Union Aktiengesellschaft. Rotating rectifier assembly. 4,048,532, Cl. 310-68.00D.

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Pammer, Gottfried; and Kvasnicka, Rudolf, 4,047,442, Cl. 74-194.000.

L.M. Ericsson Pty. Ltd.: *See—*
Ghisler, Walter, 4,048,445, Cl. 179-15.0BF.

Labaz: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, 4,048,334, Cl. 424-325.000.

Labboz, Lucien: *See—*
Bernard, Jean-Michel; Labboz, Lucien; and Vesque, Daniel, 4,048,450, Cl. 179-18.0EB.

Lacefield, William B., to Eli Lilly and Company. 2,4-Diaminoquinazolines as antithrombotic agents. 4,048,312, Cl. 424-248.560.

Lachonius, Leif: *See—*
Hallerback, Stig Lennart; and Lachonius, Leif, 4,048,527, Cl. 310-43.000.

Lafferty, John J.: *See—*
Gordon, Maxwell; and Lafferty, John J., 4,048,178, Cl. 260-293.540.

Laflamme, Daniel. Electronic keyboard display device. 4,048,634, Cl. 340-337.000.

Lagerstrom, Gosta Bertil; and Mattsson, Olof Arthur, to Boliden AB. Process and an apparatus for increasing the feed value of lignocellulosic materials. 4,048,341, Cl. 426-69.000.

Lahme, Norbert Wilhelm; and Sassmannshausen, Gunter C., to Accumulatorenwerk Hoppecke-Carl Zoellner & Sohn. Substance and device for the absorption of catalyst poisoning gases out of the oxyhydrogen gas produced by lead-acid storage batteries. 4,048,387, Cl. 429-50.000.

Lai, San-Cheng, to Rockwell International Corporation. Lithium electrode for electrical energy storage device. 4,048,395, Cl. 429-112.000.

Lakatos, Eduard: *See—*
Koberstein, Edgar; and Lakatos, Eduard, 4,048,098, Cl. 252-432.000.

Lala, Arun, to Electrochem, Inc. Zinc electrode for alkaline reserve batteries. 4,048,408, Cl. 429-229.000.

Laliberte, Shirley P. Crochet needle with cutting means. 4,047,397, Cl. 66-118.000.

Lamarque, Gabriel, to Vereinigte Edelstahlwerke AG. (VEW). Method of and apparatus for positioning consumable electrodes in an electroslag remelting bath. 4,047,555, Cl. 164-52.000.

Lambitz, Robert H.; and Zeffero, Robert J., to Zefflamb Industries, Inc. Cargo box liner for pick-up trucks. 4,047,749, Cl. 296-39.00R.

Landen, Ernest W.: *See—*
Belke, William H.; Hafele, Joseph C.; Landen, Ernest W.; and Richards, Thomas J., 4,047,984, Cl. 148-152.000.

Landesberg, William: *See—*
Seiden, Lewis J.; Landesberg, William; and Young, Gladstone F., 4,048,672, Cl. 364-200.000.

Landi, Henry Patrick: *See—*
Perciaccante, Vincent Anthony; and Landi, Henry Patrick, 4,047,533, Cl. 128-335.500.

Landis, Phillip S.: *See—*
Nnadi, John C.; and Landis, Phillip S., 4,048,082, Cl. 252-51.50A.

Landmesser, Franklin D.: *See—*
Williams, Jerry K.; and Landmesser, Franklin D., 4,047,732, Cl. 280-287.000.

Lang, John M., to Xerox Corporation. Polygon scanner with an annular lip. 4,047,793, Cl. 350-7.000.

Lang, Pierre, to J. Bobst & Fils S.A. Apparatus for separating and stacking blanks of a die cut sheet. 4,047,474, Cl. 93-36.00A.

Lange, Emroy W.: *See—*
Gary, Wardell; and Lange, Emroy W., 4,048,522, Cl. 307-293.000.

Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, to MEDITEST Institut fur medizinisch pharmazeutische Untersuchungen GmbH. 1,3-Bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine-naphthalene-1,5-disulphonate. 4,048,169, Cl. 260-251.00R.

Langeluddeke, Peter: *See—*
Albrecht, Konrad; Langeluddeke, Peter; Schumacher, Hans; and Schwerdtle, Friedhelm, 4,047,932, Cl. 71-108.000.

Langer, Roger L.; and Marlor, Alan J., to Minnesota Mining and Manufacturing Company. Offset laminated intumescent mounting mat. 4,048,363, Cl. 428-77.000.

Langford, LeRoy: *See—*
Harrer, Paul H.; and Langford, LeRoy, 4,047,638, Cl. 221-266.000.

Langhorst, Martin A.: *See—*
Sinke, Gerard C.; Langhorst, Martin A.; and May, James A., Sr., 4,048,288, Cl. 423-267.000.

Langsdorf, William P., Jr., to E. I Du Pont de Nemours and Company. Carbamoylphosphonates. 4,048,156, Cl. 260-239.00A.

Larionov, Igor Grigorievich: *See—*
Volkov, Vladimir Vladimirovich; Bagryantsev, Gennady Ivanovich; Larionov, Igor Grigorievich; Neermolov, Alexandr Filippovich; and Leontievsky, Valery Georgievich, 4,047,672, Cl. 241-175.000.

Larson, Jay Michael; Clark, Ian Sidney Rex; and Gibson, Robert Cameron, to International Nickel Company, Inc., The. Porosity reduction in inert-gas atomized powders. 4,047,933, Cl. 75-.50C.

LaSalle, Robert James: *See—*
Keisling, Nelson Woodrow, 4,047,322, Cl. 46-1.00R.

Lash, Ronald J.: *See—*
Harbulak, Edward Paul; and Lash, Ronald J., 4,048,006, Cl. 156-664.000.

Laszlavik, Marta: *See—*
Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.

Lauer, Hubert; Schenk, Norbert; and Schwerdtel, Wulf, to Bayer Aktiengesellschaft. Process for the production of cyclopentene from dicyclopentadiene. 4,048,242, Cl. 260-666.00A.

Laugesen, Ronald C.; and Shieu, Mark Shin-Dong, to National Semiconductor Corporation. MOS voltage level detecting and indicating apparatus. 4,048,524, Cl. 307-304.000.

Laurin, Arvid, to AB Jarnforadling. Propeller blading for a self-adjusting propeller for boats. 4,047,841, Cl. 416-140.000.

Lavecchia, Silvano Anthony: *See—*
Gormish, Kenneth J.; Hofelt, Clarence, Jr.; Lavecchia, Silvano Anthony; and Ripley, Clarence Arthur, Jr., 4,047,338, Cl. 51-106.00R.

Lawrence Peska Assoc., Inc.: *See—*
Bondarchuk, Walter W., Sr., 4,047,257, Cl. 14-27.000.

Lawrence Peska Associates, Inc.: *See—*
Pieters, Eli, 4,047,802, Cl. 350-97.000.

Lawter, Ray L.; Shooter, Kenneth L.; and Wills, David C., to NCR Corporation. Card reader. 4,048,476, Cl. 235-61.11D.

Lawyer, Leon C., to Chevron Research Company. Exploration system for cross-steering and stacking seismic data using a sawtooth traverse of shot points centrally spaced between at least a pair of linear detector spreads. 4,048,612, Cl. 340-15.5CP.

Layton, Roger M.: *See*—
Beck, Charles I.; and Layton, Roger M., 4,048,202, Cl. 260-410.600.

LDV Industries, Inc.: *See*—
Beers, Charles James, 4,047,747, Cl. 296-1.00S.

Leach Corporation: *See*—
Schuessler, John C.; and Tapp, David J., 4,048,601, Cl. 335-193.000.

Leal-Diaz, Jaime. Hoses for irrigation by dripping and the like and the process to manufacture the same. 4,047,995, Cl. 156-203.000.

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Minaev, Alexandr Ivanovich; Lebedev, Alexandr Valerievich; and Mogilev, Artur Viktorovich, 4,047,360, Cl. 53-122.000.

Lecart, Jean-Guy Pierre Denis; and Amalberti, Jean Claude, to Chrysler France. Safety steering-wheels for automotive vehicles. 4,047,450, Cl. 74-552.000.

Lechner, Uwe: *See*—
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.

Lee, Edward J.; and Vavra, Frank, to United States Steel Corporation. Detachable lip ring for steelmaking converter. 4,047,708, Cl. 266-243.000.

Lee, Gary D.; Vartanian, Paul F.; and Biasotti, Joseph B., to Texaco Inc. Lubricating oil composition. 4,048,080, Cl. 252-51.540.

Lee, Jerald Dana, to Du Pont de Nemours, E. I., and Company. Light-sensitive control for colored light projector. 4,048,493, Cl. 250-205.000.

Lee, John Malcolm, to Dow Chemical Company, The. Removal of heavy metals from aqueous solutions. 4,048,283, Cl. 423-92.000.

Lee, Kam Bor, to Gabot Corporation. Process for the production of finely-divided metal and metalloid oxides. 4,048,290, Cl. 423-336.000.

Lee, Kwan-Hua, to University of California, The Regents of the. C20 and C22 acids to promote wound healing. 4,048,204, Cl. 260-413.000.

Lee, Marion D. Bait dispenser. 4,047,320, Cl. 43-55.000.

Lee, Suh Y.: *See*—
Stumbar, James P.; Carl, Daniel E.; and Lee, Suh Y., 4,047,972, Cl. 134-2.000.

Lee, Yoon C., to Monsanto Company. Rubber modified fire retardant polymer compositions. 4,048,263, Cl. 260-890.000.

Leerskov, Arthur E., Jr.: *See*—
Ward, Phillip W.; Donald, Robert C., Jr.; and Leerskov, Arthur E., Jr., 4,047,591, Cl. 181-119.000.

LeFebvre, Clarence A.; and Cabezut, Joseph M., Jr., to United States of America, Army. Thrust management control propulsion system. 4,047,382, Cl. 60-252.000.

Lehmann, Oskar. Fitting for an article of furniture. 4,047,822, Cl. 403-187.000.

Lehmann, Rolf, to Escher Wyss Limited. Support for continuously cast hot metal components. 4,047,274, Cl. 29-121.400.

Lemke, Winfred R., to Square D Company. Solid state overload relay transformer circuit. 4,048,663, Cl. 361-75.000.

Leontievsky, Valery Georgievich: *See*—
Volkov, Vladimir Vladimirovich; Bagryantsev, Gennady Ivanovich; Larionov, Igor Grigorievich; Neermolov, Alexandr Filippovich; and Leontievsky, Valery Georgievich, 4,047,672, Cl. 241-175.000.

Lessner, David L.: *See*—
Soodak, Charles; Lessner, David L.; and Macemon, James H., 4,047,820, Cl. 356-244.000.

Lester, Thomas J., to Lester Tire Company, The. Composite motorcycle wheel construction. 4,047,764, Cl. 301-6.00V.

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Lester, Thomas J., 4,047,764, Cl. 301-6.00V.

Leutner, Bernd: *See*—
Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, 4,048,135, Cl. 260-40.00R.

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Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Brodsky, Larry; and Kushner, Ben, 4,047,282, Cl. 29-432.000.

Leveque, Rene, to Automobiles Peugeot. Speed variator having friction elements. 4,047,443, Cl. 74-199.000.

Lever Bros. Co.: *See*—
Heslam, Robin Snell, 4,048,085, Cl. 252-102.000.

Levi Strauss & Co.: *See*—
Blessing, Hubert, 4,047,622, Cl. 214-8.50A.

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Blaisdell, Ronald G.; Hough, Harold L.; and Levin, Robert E., 4,048,537, Cl. 313-489.000.

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Lewis, Alan Y.: *See*—
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Spiers, Steven F.; Lewis, Howard M.; Kraft, Gerald A.; and Pasquine, Arthur R., 4,047,421, Cl. 73-1.00R.

Lewis, Richard C. Dispenser for granular material. 4,047,647, Cl. 222-480.000.

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Oelke, Waldemar W.; and Hagedorn, Floyd T., 4,047,919, Cl. 65-273.000.

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Burkhardt, Gisbert; and Hofmann, Dieter, 4,047,712, Cl. 271-64.000.
Schaffernicht, Klaus; Hentrich, Josef; Klein, Herbert; and Kuckenburg, Karl-Heinz, 4,047,915, Cl. 65-106.000.
Sedlacek, Herbert, 4,047,815, Cl. 356-104.000.

Liebermann, Benno E. Apparatus for cooking food articles. 4,047,476, Cl. 99-325.000.

Liebig, William J.; and Rodriguez-M, German, to Meadox Medicals, Inc. Double-velour synthetic vascular graft. 4,047,252, Cl. 3-1.400.

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Lindauer Dornier Gesellschaft mbH.: *See*—
John, Heinz, 4,047,270, Cl. 28-205.000.

Lindblad, Oskar Lennart. Device in connection with locks for safety belts. 4,047,267, Cl. 24-230.0AL.

Linde Aktiengesellschaft: *See*—
Rossmaier, Viktor, deceased, 4,048,286, Cl. 423-242.000.

Lingscheit, James N.: *See*—
Heintz, Walter K.; and Lingscheit, James N., 4,048,393, Cl. 429-104.000.

List, Hans. Device for the arrangement, alignment and correctly positioned feed of articles in particular having elongated shape. 4,047,636, Cl. 221-161.000.

Lister, Edward Alan; and Clarke, Graham Wilson, to Brdr. Schur International A. S. Packaging machine for inserting articles into bags. 4,047,362, Cl. 53-189.000.

Litchfield, John H.; and Vely, Victor G., to William Wrigley, Jr. Co. Anticaries confectionaries and oral health products. 4,048,299, Cl. 424-49.000.

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Gloskey, Carl R.; and Littman, Stanley, 4,048,294, Cl. 423-618.000.

Liu, Chi-sheng; and Weaver, Lelland A. C., to Westinghouse Electric Corporation. Bismuth halide vapor laser. 4,048,587, Cl. 331-94.50G.

Liu, Yung S., to General Electric Company. Broadband laser with intracavity crystal for generating second harmonic radiation. 4,048,515, Cl. 307-88.300.

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Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,048,427, Cl. 526-337.000.

Lo, Mei-Kuo; and Sheppard, Erwin, to S. C. Johnson & Son, Inc. Child-safe aerosol actuator. 4,047,646, Cl. 222-402.130.

Lob, Udo; and Scheidel, Fritz, to Siemens Aktiengesellschaft. Process for the production of semiconductor elements. 4,047,286, Cl. 29-578.000.

Lochner, Herbert, to cikalon-Vliesstoff-werke GmbH. Method and apparatus for producing ornamentally patterned, needled, nonwoven pile fabrics. 4,047,269, Cl. 28-109.000.

Lockwood, Harry Francis: *See*—
Ettenberg, Michael; and Lockwood, Harry Francis, 4,048,627, Cl. 357-17.000.

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Lohmann, Larry John, to Owens-Illinois, Inc. Novel packaging and supporting means for flat glass panels. 4,047,612, Cl. 206-454.000.

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Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.

L'Opochimie: *See*—
Boige, Jean, 4,048,303, Cl. 424-94.000.

Lorant, Ivan: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

L'Oreal: *See*—
Aubert, Lucien Paul, 4,048,308, Cl. 424-195.000.
Papantoniou, Christos, 4,047,888, Cl. 8-10.200.
Papantoniou, Christos, 4,048,301, Cl. 424-70.000.

Lorenz, Horst; Koch, Rolf Eckart; and Kahlhofer, Reiner, to Th. Kieserling & Albrecht. Machine for working metal surface. 4,047,470, Cl. 90-15.00R.

Lotis, Leonard L. Body washing apparatus. 4,047,259, Cl. 15-104.920.

Love, Roosevelt: *See*—
Childs, Jerry D.; and Love, Roosevelt, 4,047,567, Cl. 166-293.000.

LoVecchio, Paul: *See*—
Cox, John T.; Garber, Michael B.; Jasper, Marilyn A.; and LoVecchio, Paul, 4,048,535, Cl. 313-367.000.

Lu, Chin H., to Xerox Corporation. Method of developing electrostatic latent images with conductive liquid developer. 4,047,943, Cl. 96-1.0LY.

Lucchesi, Benedict R., to University of Michigan, The Regents of the. Method of inhibiting myocardial ischemia in mammals using quaternary salts. 4,048,335, Cl. 424-329.000.

Ludwig, Frank A., to Ford Motor Company. Secondary battery or cell with vitreous carbon coated graphite current collector. 4,048,394, Cl. 429-104.000.

Ludwig, George, to Tom McGuane Industries, Inc. Butterfly valve. 4,047,696, Cl. 251-308.000.

Ludwig, Nelson Henry, to Eli Lilly and Company. Stabilization method. 4,048,268, Cl. 264-15.000.

Lund, Clarence A.: *See*—
Bledsoe, Jerry L.; and Lund, Clarence A., 4,047,976, Cl. 148-1.500.

Lundahl, Robert O., to Raymond Lee Organization, Inc., The. Rollable walk guide. 4,047,825, Cl. 404-70.000.

Lundin, Lars Olof, to AB Bofors. Device for generating oil pressure for an artillery piece or a corresponding unit. 4,047,467, Cl. 89-41.00H.

Lunn, William H. W.; and Mason, Edward V., to Eli Lilly and Company. 7-[α-(Benzimidazol-2-ylcarbonylamino)-arylacetamido]cephalosporins. 4,048,161, Cl. 544-27.000.

Lurssen, Klaus: *See*—
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,047,923, Cl. 71-76.000.

Luttrell, John E.: *See*—
Colvin, Floyd E.; and Luttrell, John E., 4,048,075, Cl. 210-484.000.

Lyberg, Bertil, to Telefonaktiebolaget L M Ericsson. Oscillator frequency control loop. 4,048,581, Cl. 331-1.00A.

Lyssy, Georges H. Process for measuring permeability to gas of walls and/or closure of three-dimensional encasing elements. 4,047,422, Cl. 73-38.000.

M&T Chemicals Inc.: *See*—
Gloskey, Carl R.; and Littman, Stanley, 4,048,294, Cl. 423-618.000.
Harbulak, Edward Paul; and Lash, Ronald J., 4,048,006, Cl. 156-664.000.

Maag, Helmut: *See*—
Krall, Heribert A.; and Maag, Helmut, 4,047,468, Cl. 90-11.00C.

Mac Machine & Metal Works Inc.: *See*—
McCombs, Paul W., 4,047,656, Cl. 228-27.000.

Macemon, James H.: *See*—
Soodak, Charles; Lessner, David L.; and Macemon, James H., 4,047,820, Cl. 356-244.000.

Machacek, Jiri: *See*—
Kralicek, Jaroslav; Kubanek, Vladimir; Kondelikova, Jaroslava; Casensky, Bohuslav; and Machacek, Jiri, 4,048,421, Cl. 526-177.000.

Machida, Takayasu: *See*—
Nakajima, Fumio; Machida, Takayasu; and Yamada, Kenji, 4,048,548, Cl. 318-138.000.

Machleder, Warren H.; and Bollinger, Joseph M., to Rohm and Haas Company. Multipurpose fuel additive. 4,048,081, Cl. 252-51.50R.

Mackisoc, Noel J.: *See*—
Fink, August A., Jr.; and Mackisoc, Noel J., 4,048,659, Cl. 360-72.000.

MacLeay, Ronald Edward; and Sheppard, Chester Stephen, to Pennwalt Corporation. Process for polymerizing unsaturated monomers and unsaturated polyester resins employing unsymmetrical tertiary-aliphatic azoalkanes. 4,048,423, Cl. 526-209.000.

MacLeod, David E.: *See*—
Krick, Edward F.; and MacLeod, David E., 4,047,776, Cl. 312-245.000.

MacMullin, Robert Burns, to B. F. Goodrich Company, The. Electrolytic cell design. 4,048,046, Cl. 204-266.000.

Madden, Thomas Harry; and Reash, Clair Wilbur, to Union Carbide Corporation. Cathode ray tube processing. 4,048,545, Cl. 316-2.000.

Maechtle, Gary L.: *See*—
Svoboda, Glenn R.; Suh, John T.; Carlstrom, William L.; and Maechtle, Gary L., 4,048,104, Cl. 260-2.5AN.

Maeda Industries, Ltd.: *See*—
Ozaki, Nobuo, 4,047,603, Cl. 192-64.000.

Maeda, Muneyoshi; Watanabe, Shigeo; Takahashi, Hidenori; and Sogi, Toshiyuki, to Bridgestone Tire Company Limited. Pneumatic radial tire for heavy load vehicles. 4,047,552, Cl. 152-361.00R.

Magoveny, George S.; and Forgo, Eric J., to Windsunwatt, Inc. Horizontal multidirectional turbine windmill. 4,047,834, Cl. 415-3.000.

Magyar Vagon- es Gepgyar: *See*—
Toth, Laszlo; Schirhuber, Janos; Prepost, Kalman; and Tassi, Andras, 4,048,466, Cl. 219-121.0EM.

Mahan, John E.: *See*—
Gardner, Lloyd E.; Fahey, Darryl R.; and Mahan, John E., 4,048,238, Cl. 260-618.00R.

Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, to Boehringer Ingelheim GmbH. Aldehyde-erythromycylamine condensation products. 4,048,306, Cl. 424-180.000.

Main, George: *See*—
Eschenauer, Paul R.; and Main, George, 4,047,881, Cl. 431-215.000.

Maitland, Alexander, to Swiss Aluminium Ltd. Continuous junction between aluminum conductor rails. 4,047,600, Cl. 191-29.00R.

Majer, Janos: *See*—
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.

Majidzadeh, Kamran; and Guirguis, Hani R., to Dampocrete Incorporated. Concrete composition. 4,047,967, Cl. 106-90.000.

Makely, Joseph E. Core drill. 4,047,828, Cl. 408-145.000.

Malik, Jiri: *See*—
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.

Mallinckrodt, Inc.: *See*—
Wolfangel, Robert George, 4,048,296, Cl. 424-1.000.

Mallory, Edwin F., to National-Standard Company. Tire building apparatus. 4,048,002, Cl. 156-403.000.

Manfred, Mark Thomas: *See*—
Canniff, Ronald Jay; and Manfred, Mark Thomas, 4,048,448, Cl. 179-17.00E.

Mannesmann Aktiengesellschaft: *See*—
Ott, Hubert, 4,047,606, Cl. 197-1.00R.

Mannila, Donald A.: *See*—
Mannila, Richard S.; Mannila, Fred E.; and Mannila, Donald A., 4,048,442, Cl. 179-1.0GP.

Mannila, Fred E.: *See*—
Mannila, Richard S.; Mannila, Fred E.; and Mannila, Donald A., 4,048,442, Cl. 179-1.0GP.

Mannila, Richard S.; Mannila, Fred E.; and Mannila, Donald A. Stereophonic sound adaptor for simulating sound movement. 4,048,442, Cl. 179-1.0GP.

Manz, August Frederick, to Union Carbide Corporation. Method and torch for sustaining multiple coaxial arcs. 4,048,465, Cl. 219-121.00R.

Mapp, Alan L. Attractor element for fishing lure. 4,047,318, Cl. 43-42.240.

Margotte, Dieter: *See*—
Adelmann, Siegfried; Margotte, Dieter; and Merten, Josef, 4,048,133, Cl. 260-37.0PC.

Markland, R. Donald, to Consolidated Freightways, Inc. Turbocharger and air cleaner device. 4,047,912, Cl. 55-406.000.

Marley Company, The: *See*—
Fordyce, Homer E.; and Carter, William C., 4,048,265, Cl. 261-111.000.

Marlor, Alan J.: *See*—
Langer, Roger L.; and Marlor, Alan J., 4,048,363, Cl. 428-77.000.

Marsh, Norman F.; and Eng, William T., to Dickey-john Corporation. Bin depth monitor. 4,047,434, Cl. 73-304.00R.

Marsh, Ronald W.: *See*—
Gutridge, Jack E.; Marsh, Ronald W.; and Newbury, Grant M., 4,047,488, Cl. 105-315.000.

Marshall, John R.: *See*—
Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

Marson Corporation: *See*—
Di Maio, Anthony E.; and Todisco, Joseph G., 4,047,281, Cl. 29-429.000.

Martan, Michael, to UOP Inc. Photopolymerization using an alpha-aminoacetophenone. 4,048,034, Cl. 204-159.230.

Martin, Joachim; Haas, Ernst; and Schnoeller, Manfred, to Siemens Aktiengesellschaft. Apparatus for doping a semiconductor crystalline rod. 4,048,508, Cl. 250-492.00A.

Martin Processing, Inc.: *See*—
Hermes, Julius, 4,047,889, Cl. 8-93.000.

Marton, Gyorgy: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.

Maruo, Zenichi: *See*—
Nakamachi, Akio; and Maruo, Zenichi, 4,048,101, Cl. 260-2.50E.

Maruta, Rikio, to Nippon Electric Company, Limited. PCM-TASI signal transmission system. 4,048,447, Cl. 179-15.0AS.

Maruyama, Iwao; and Kanai, Shigeo, to Honda Giken Kogyo Kabushiki Kaisha. Sonic nozzle apparatus in a carburetor flow testing machine. 4,047,426, Cl. 73-118.000.

Maruyama, Jiro, to Hakodate Seimo Sengu Co., Ltd. Knotted fishing net. 4,047,316, Cl. 43-7.000.

Marvel Specialty Company: *See*—
Gregory, Clifton, 4,047,649, Cl. 223-43.000.

Marz, Frank Hubert, to Bunker Ramo Corporation. Clock mechanism. 4,047,376, Cl. 58-23.00D.

Maschinenfabrik Rau OHG: *See*—
Rau, Willy; and Taus, Christian, 4,047,576, Cl. 172-540.000.

Mason, Edward V.: *See*—
Lunn, William H. W.; and Mason, Edward V., 4,048,161, Cl. 544-27.000.

Master Lock Company: *See*—
Foote, Daniel J., 4,047,406, Cl. 70-25.000.

Matono, Hirokuni: *See*—
Murakami, Yasuo; Ushio, Masatoshi; and Matono, Hirokuni, 4,047,364, Cl. 53-389.000.

Matsubayashi, Toru: *See*—
Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, 4,048,021, Cl. 203-91.000.

Matsuda, Masaoki: *See*—
Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, 4,048,197, Cl. 260-346.300.

Matsuda, Yoshio, to Yoshida Kogyo Kabushiki Kaisha. Fastener stringer. 4,047,265, Cl. 24-205.16C.

Matsuda, Yoshio; and Fujisaki, Yoshinori, to Yoshida Kogyo Kabushiki Kaisha. Reinforcement for slide fasteners. 4,047,402, Cl. 66-195.000.

Matsui, Hisashi: *See*—
Arakawa, Masatoshi; Ohno, Ryotaro; Ishikawa, Katuhiro; Yamahara, Noboru; and Matsui, Hisashi, 4,048,147, Cl. 260-67.0UA.

Matsui, Mitsuhiro: *See*—
Hiratake, Susumu; and Matsui, Mitsuhiro, 4,048,436, Cl. 13-2.00P.

Matsushita, Kunichi; Sakurada, Hikaru; Onuma, Kazuhiko; and Fujii, Shinichi, to Mitsubishi Chemical Industries Ltd. Catalyst for selective reduction of nitrogen oxides. 4,048,112, Cl. 252-461.000.

Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, to Mitsui Petrochemical Industries Ltd.

Process for polymerization of olefins and catalyst composition therefor. 4,048,415, Cl. 526-119.000.

Matter, Paul: *See*—
Wertli, Josef; and Matter, Paul, 4,048,467, Cl. 219-131.00R.

Matthews, Russell Byron, to Johnson Controls, Inc. Electronic control arrangement for detecting a leak condition for a valve. 4,047,878, Cl. 431-22.000.

Mattsson, Olof Arthur: *See*—
Lagerstrom, Gosta Bertil; and Mattsson, Olof Arthur, 4,048,341, Cl. 426-69.000.

Maule, Clemente. D.C. arc welder with solid state components. 4,048,468, Cl. 219-135.000.

Maxs AG: *See*—
Rothbauer, Horst, 4,048,397, Cl. 429-131.000.

May & Baker Limited: *See*—
Berg, Samuel Sidney; Jenkins, David Conwil; and Phillipson, Ronald Frederick, 4,048,326, Cl. 424-300.000.

May, Czeslaw J.; and Piepho, Donald A., to Caterpillar Tractor Co. Bypass valve. 4,047,542, Cl. 137-627.500.

May, James A., Sr.: *See*—
Sinke, Gerard C.; Langhorst, Martin A.; and May, James A., Sr., 4,048,288, Cl. 423-267.000.

May, Walter R.; Zetlmeisl, Michael J.; and Koch, Kenneth W., to Petrolite Corporation. Inhibition of corrosion in fuels with Mg/Si/Mn combinations. 4,047,875, Cl. 431-3.000.

Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., to Regal Tool & Rubber Co., Inc. Grout seal. 4,047,391, Cl. 61-94.000.

Mayo, Howard A., Jr.; and Swiecicki, Ignacy, to Allis-Chalmers Corporation. Method for reducing hydraulic turbine seal temperature while turbine runner is rotating in air. 4,047,831, Cl. 415-1.000.

Mazak, Milos: *See*—
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,048,008, Cl. 162-104.000.

Mazzei, Umberto: *See*—
Dogliotti, Renato; Mazzei, Umberto; and Mengali, Umberto, 4,048,572, Cl. 329-104.000.

McAllister, Thomas W.: *See*—
Eames, Loren W.; Berg, Joseph A.; and McAllister, Thomas W., 4,047,757, Cl. 297-230.000.

McAndless, John Madden, to Canada, Her Majesty the Queen in right of, as represented by the secretary of National Defence. Insect repellent collar. 4,047,505, Cl. 119-106.000.

McCafferty, Gerald P., to Budd Company, The. Liquid level control means and method. 4,047,655, Cl. 228-259.000.

McCarey, Thomas Joseph: *See*—
Brookes, Neil Roger; Ray, Martin George; Cohen, Joseph David; and McCarey, Thomas Joseph, 4,047,379, Cl. 60-39.09D.

McCluskey, Douglas; and Kelchner, Harley E., to Glass Medic, Inc. Apparatus for repair of shatterproof glass. 4,047,863, Cl. 425-13.000.

McCollum, Samuel C., to Sangamo Electric Company. Split core current transformer having an interleaved joint and hinge structure. 4,048,605, Cl. 336-176.000.

McCombs, Paul W., to Mac Machine & Metal Works Inc. Orbital motion welding head. 4,047,656, Cl. 228-27.000.

McCord Corporation: *See*—
Salisbury, Wayne C., 4,048,105, Cl. 260-2.5AC.

McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., to Thiokol Corporation. Support system for rocket thrust nozzles 4,047,667, Cl. 239-265.350.

McCullough, J. Robert, to Schramm, Inc. Air diffusers. 4,048,072, Cl. 210-220.000.

McDaniel, Donald L.: *See*—
Bartrug, Norman G.; and McDaniel, Donald L., 4,047,429, Cl. 73-150.00R.

McDonald, Quentin H.; and Panicci, Richard L., to McDonald, Quentin H. Restraining means for an infant car seat. 4,047,755, Cl. 297-216.000.

McDonald, Richard D.: *See*—
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.

McElwain, John Christee; and Hogan, Lawrence Howard, to Rockwell International Corporation. Universal joint and cross therefor. 4,047,396, Cl. 64-17.00A.

McGee, John K., to Gray Tool Company. Valve seat-to-seat connection for easy installation and removal of seat. 4,047,697, Cl. 251-328.000.

McGeehin, Robert; and Dodswoth, Edward. Lid having a separable panel. 4,047,634, Cl. 220-270.000.

McIntosh Laboratory, Incorporated: *See*—
Evans, Ronald C.; and Corderman, Sidney A., 4,048,573, Cl. 330-2.000.

McKay, Allen J., executor: *See*—
McKay, James G., deceased; and McKay, Allen J., executor, 4,047,479, Cl. 101-36.000.

McKay, James G., deceased; and by McKay, Allen J., executor, to Kiwi Coders Corporation. High speed article coding machine. 4,047,479, Cl. 101-36.000.

McMaster, Elmer L.; Grenley, Dallas G.; and Prueter, Elton D., to Dow Chemical Company, The. Process for providing improved head points in concrete block construction with latex-epoxy-cement adhesive. 4,048,000, Cl. 156-304.000.

McMullen, Richard Arnold. Watch band. 4,047,651, Cl. 224-4.00D.

McNamara, David M.; and Boettcher, Stephen A., to Speedfam Corporation. Abrasive slurry regulator assembly. 4,047,639, Cl. 222-64.000.

McNamara, David M.; and Boettcher, Stephen A., to Speedfam Corporation. Abrasive slurry regulator assembly. 4,047,640, Cl. 222-64.000.

McNeary, Richard C., to Raymond Lee Organization, Inc., The, a part interest. Lockable gas tank cap device. 4,047,744, Cl. 292-171.000.

McNees, Gary Keith, to Bell Telephone Laboratories, Incorporated. Arrangement for monitoring live call disposition signals. 4,048,451, Cl. 179-18.0AH.

McNeil Laboratories, Incorporated: *See*—
Carson, John Robert, 4,048,191, Cl. 260-326.470.

McNeilly, Michael A.; and Benzing, Walter C., to Applied Materials, Inc. Epitaxial radiation heated reactor. 4,047,496, Cl. 118-49.100.

McPeak, Earl W., Jr.: *See*—
Canup, Robert E.; and McPeak, Earl W., Jr., 4,047,783, Cl. 339-97.00R.

McQuinn, Ted M., to General Motors Corporation. Shift signal valve hysteresis. 4,047,454, Cl. 74-868.000.

McSweeney, Diarmuid Justin, to Johns-Manville Corporation. Ceiling support grid system. 4,047,348, Cl. 52-484.000.

Mead Corporation, The: *See*—
Seaborn, Paul Edward; and Dawson, Kenneth Harold, 4,047,544, Cl. 140-105.000.
Stout, James T.; and Plaxico, Robert E., 4,047,610, Cl. 206-187.000.

Meadox Medicals, Inc.: *See*—
Liebig, William J.; and Rodriguez-M, German, 4,047,252, Cl. 3-1.400.

Mearl Corporation, The: *See*—
Armanini, Louis; and Johnson, Cordell E., 4,047,969, Cl. 106-291.000.

Mecondor S.p.A.: *See*—
Terzaghi, Giovanni, 4,048,399, Cl. 429-141.000.

MEDITEST Institut fur medizinisch pharmazeutische Untersuchungen GmbH: *See*—
Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, 4,048,169, Cl. 260-251.00R.

Medizinska Akademia: *See*—
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.

Megahed, El Sayed, to ESB Incorporated. High drain rate, primary alkaline cell having a divalent silver oxide/monovalent silver oxide depolarizer blend coated with a layer of silver. 4,048,405, Cl. 429-206.000.

Meisel, Thomas C., Jr., to Caterpillar Tractor Co. Clamshell bucket for wheel loader. 4,047,626, Cl. 214-147.00G.

Meiser, Werner; Buchel, Karl Heinz; Kramer, Wolfgang; and Grewe, Ferdinand, to Bayer Aktiengesellschaft. 1-Substituted-1,2,4-triazole fungicides. 4,048,318, Cl. 424-269.000.

Memis, Irving: *See*—
Bakos, Peter; Memis, Irving; and Rasile, John, 4,048,356, Cl. 427-379.000.

Memminger, Gustav: *See*—
Fecker, Josef; and Memminger, Gustav, 4,047,398, Cl. 66-132.00R.

Menegus, Robert L. Automatically rotatable sloop rig. 4,047,493, Cl. 114-102.000.

Menet, Albert: *See*—
Chabardes, Pierre; Julia, Marc; and Menet, Albert, 4,048,234, Cl. 260-607.0AR.

Mengali, Umberto: *See*—
Dogliotti, Renato; Mazzei, Umberto; and Mengali, Umberto, 4,048,572, Cl. 329-104.000.

Menzl, Roland L.; and Hopkins, P. Donald, to Standard Oil Company (Indiana). Reactivation of hydrotreating catalyst by operating at a temperature in excess of normal operating temperature. 4,048,094, Cl. 252-414.000.

Mercier, Julien; Mercier, Real; and Mercier, Raymond. Shower head liquid dispenser. 4,047,541, Cl. 137-564.500.

Mercier, Raymond: *See*—
Mercier, Julien; Mercier, Real; and Mercier, Raymond, 4,047,541, Cl. 137-564.500.

Mercier, Real: *See*—
Mercier, Julien; Mercier, Real; and Mercier, Raymond, 4,047,541, Cl. 137-564.500.

Merck & Co., Inc.: *See*—
Baldwin, John J.; and Novello, Frederick C., 4,048,183, Cl. 260-296.00R.
Chemerda, John M.; and Gal, George, 4,048,224, Cl. 260-534.00C.
Engelhardt, Edward L., 4,048,223, Cl. 260-556.0AR.

Merten, Josef: *See*—
Adelmann, Siegfried; Margotte, Dieter; and Merten, Josef, 4,048,133, Cl. 260-37.0PC.

Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See*—
Jonda, Wolfgang, 4,048,360, Cl. 428-35.000.

Meszaros, Lajos: *See*—
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.

Metallgesellschaft Aktiengesellschaft: *See*—
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Zolzer, Karlheinz, 4,047,901, Cl. 48-86.00R.

Metallurgical Processes Limited: *See*—
Hopkin, William, 4,048,282, Cl. 423-24.000.

Metcom Products Company: *See*—
Pinchock, Donald E., 4,047,725, Cl. 280-11.280.

Meusburger, Guenther: *See—*
Hoffmann, Kurt; Meusburger, Guenther; and Wotruba, Gottfried, 4,048,519, Cl. 307-221.00D.
Meyer, Arnold: *See—*
Wassermann, Martin; and Meyer, Arnold, 4,048,295, Cl. 423-626.000.
Mezzanotte, Mario, to Industrie Pirelli S.p.A. Radial tires provided with improved sidewall-stiffening structure. 4,047,551, Cl. 152-354.000.
Michel, Gerald W.: *See—*
Slack, Roger A.; and Michel, Gerald W., 4,047,314, Cl. 40-28.00C.
Miedema, Hotze, to Bell Telephone Laboratories, Incorporated. Method and apparatus for testing microwave repeaters for IM distortion. 4,048,559, Cl. 324-57.0SS.
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, to BASF Aktiengesellschaft. Manufacture of copolymers of ethylene. 4,048,411, Cl. 526-64.000.
Mieville, Rodney L.: *See—*
Petersen, Richard D.; and Mieville, Rodney L., 4,048,058, Cl. 208-138.000.
Miga, Christian John, to Johns-Manville Corporation. Stabilization of talc-filled polystyrene. 4,048,138, Cl. 260-42.370.
Mihara, Hironobu: *See—*
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, 4,047,556, Cl. 164-57.000.
Mikhailov, Anatoly Ivanovich: *See—*
Karpov, Valentin Mikhailovich; Santo, Vladimir Rezhevich; Yanovsky, Viktor Yakovlevich; Mikhailov, Anatoly Ivanovich; and Belyaev, Mikhail Fedorovich, 4,047,428, Cl. 73-141.00A.
Mikhailov, Vsevolod Andreevich: *See—*
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.
Miles, Ray P., to Copperloy Corporation. Tow bar assembly. 4,047,734, Cl. 280-486.000.
Miles, Wilbur Nelson: *See—*
Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, 4,047,829, Cl. 408-169.000.
Miller, Harry R.: *See—*
Borba, Paul A.; and Miller, Harry R., 4,047,504, Cl. 119-92.000.
Miller, Imrich M., to Universal Manufacturing Corporation. Inductive device with bobbin. 4,048,606, Cl. 336-198.000.
Miller, James A.; and Firkins, Morris L., to Bell & Howell Company. Color-corrected video signal processing with augmented color lock. 4,048,651, Cl. 358-8.000.
Miller, Jorge. Electrolytic cell for treatment of water. 4,048,030, Cl. 204-149.000.
Miller, Robert L.: *See—*
Grange, Raymond A.; and Miller, Robert L., 4,047,979, Cl. 148-12.00R.
Miller, Walter E., Jr.; Duke, Jimmy R.; and Sitton, Robert L., to United States of America, Army. Modulated, dual frequency, optical tracking link for a command guidance missile system. 4,047,678, Cl. 244-3.160.
Mims, Bruce L., to Branson Ultrasonics Corporation. Method and apparatus for joining metal workpieces using high frequency vibratory energy. 4,047,657, Cl. 228-103.000.
Minaev, Alexandr Ivanovich; Lebedev, Alexandr Valerievich; and Mogilev, Artur Viktorovich. Automatic machine for making packages of viscous food products by enclosing in a casing. 4,047,360, Cl. 53-122.000.
Minarick, Joseph W.: *See—*
Avena, Salvatore; and Minarick, Joseph W., 4,047,842, Cl. 416-152.000.
Minnesota Mining and Manufacturing Company: *See—*
Graham, Joseph, 4,048,103, Cl. 260-2.50B.
Grunstad, Jerome A.; and Eischens, Richard G., 4,047,637, Cl. 221-265.000.
Karst, Karl A.; and Sowman, Harold G., 4,047,965, Cl. 106-65.000.
Langer, Roger L.; and Marlor, Alan J., 4,048,363, Cl. 428-77.000.
Taylor, Allen L., 4,048,526, Cl. 310-329.000.
Minolta Camera Kabushiki Kaisha: *See—*
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
Okano, Yukio; Kita, Nobuyuki; and Uesugi, Kyozo, 4,047,807, Cl. 350-266.000.
Minot, Pierre J. M. Generators of anharmonic binary sequences. 4,048,480, Cl. 235-152.000.
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Miwa, Akihoro; and Misono, Shigemi, 4,048,478, Cl. 235-92.00T.
Mission Marketing Corporation of Arizona: *See—*
Cox, Howard W., 4,047,475, Cl. 98-116.000.
Mitchell, Earl R.; Brown, Thomas D.; and Post, Beverley C., to Canadian Patents and Development Limited. Oil burner assembly. 4,047,879, Cl. 431-183.000.
Mitchell, Matthew Joseph, Jr.: *See—*
Callahan, Robert William; Kauffman, Paul Eugene; and Mitchell, Matthew Joseph, Jr., 4,048,671, Cl. 364-200.000.
Mitenkov, Fedor Mikhailovich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Mitsubishi Chemical Industries Ltd.: *See—*
Matsushita, Kunichi; Sakurada, Hikaru; Onuma, Kazuhiko; and Fujii, Shinichi, 4,048,112, Cl. 252-461.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Jidai, Eiki; Ono, Hiroshi; and Shibayama, Kyoichi, 4,048,379, Cl. 428-500.000.
Okura, Masaatsu; Ota, Kazutoshi; and Otomi, Sadayuki, 4,047,597, Cl. 187-95.000.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Yoshinaka, Shigeo; Uchiyama, Seiji; and Doya, Masaharu, 4,048,033, Cl. 204-158.0HA.
Mitsubishi Rayon Co., Ltd.: *See—*
Ide, Fumio; and Kodama, Tsuneo, 4,048,035, Cl. 204-159.150.
Mitsui Petrochemical Industries Ltd.: *See—*
Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, 4,048,415, Cl. 526-119.000.
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.
Mitsui Toatsu Chemicals, Incorporated: *See—*
Sugita, Yasunori; and Itagaki, Yasuhiko, 4,048,409, Cl. 526-5.000.
Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chem., Inc.): *See—*
Kobayashi, Sadao; Ozawa, Hiroshi; and Kobayashi, Nobuki, 4,048,136, Cl. 260-42.140.
Miura, Hiroshi, to Tokyo Shibaura Electric Co., Ltd. Permanent magnets of different magnetic materials for magnetrons. 4,048,542, Cl. 315-39.710.
Miura, Kimio: *See—*
Takahashi, Noriyuki; and Miura, Kimio, 4,047,728, Cl. 180-141.000.
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Mixan, Craig E.; and Pews, R. Garth, to Dow Chemical Company, The. (((Aryl)thio)methylene)-propanedinitriles. 4,048,213, Cl. 260-465.00F.
Miyake, Kenji: *See—*
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, 4,047,514, Cl. 125-40.000.
Miyawaki, Kenji: *See—*
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, 4,048,275, Cl. 264-54.000.
Mizutani, Takashi: *See—*
Kudo, Kazuo; and Mizutani, Takashi, 4,047,868, Cl. 425-133.100.
Mobil Oil Corporation: *See—*
Garwood, William E.; Jacob, Solomon M.; Kuo, James C.; and Wise, John J., 4,048,250, Cl. 260-683.430.
Nnadi, John C.; and Landis, Phillip S., 4,048,082, Cl. 252-51.50A.
Moeglich, Karl, to Clearwater Systems Inc. Sorbent particulate material and manufacture thereof. 4,048,028, Cl. 204-97.000.
Mogilev, Artur Viktorovich: *See—*
Minaev, Alexandr Ivanovich; Lebedev, Alexandr Valerievich; and Mogilev, Artur Viktorovich, 4,047,360, Cl. 53-122.000.
Mohring, Edgar: *See—*
Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, 4,048,315, Cl. 424-249.000.
Molinari, Thomas Edward: *See—*
Knight, Stanley Paul; and Molinari, Thomas Edward, 4,048,597, Cl. 334-15.000.
Molteni, Luigi; Vercesi, Gian Piero; and Antonini, Eraldo, to Dr. L. Zambeletti S.p.A. Tripeptides, their esters and amides, and anti-ulcera activity thereof. 4,048,305, Cl. 424-177.000.
Mommertz, Elmar: *See—*
Kulessa, Gerhard; and Mommertz, Elmar, 4,047,525, Cl. 128-208.000.
Monier Colourtile Pty. Ltd.: *See—*
Aarons, Raymond Joseph, 4,047,353, Cl. 52-713.000.
Monsanto Company: *See—*
Gaertner, Van R.; and Hamm, Philip C., 4,047,927, Cl. 71-86.000.
Hoge, A. Russell; and Myers, Robert A., 4,048,274, Cl. 264-46.500.
Ingram, Woodrow Hayes, II, 4,048,125, Cl. 260-7.000.
Lee, Yoon C., 4,048,263, Cl. 260-890.000.
Rueppel, Melvin L., 4,047,926, Cl. 71-86.000.
Montano, Angelo. Toy gaming device. 4,047,718, Cl. 273-98.000.
Montedison S.p.A.: *See—*
Ribaldone, Giuseppe; and Borsotti, Giampiero, 4,048,173, Cl. 260-272.000.
Montier, Michel: *See—*
Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, 4,047,436, Cl. 73-362.0SC.
Moore, Cecil L.: *See—*
Mulvaney, Ronald J.; and Moore, Cecil L., 4,047,431, Cl. 73-170.00R.
Moore, Kenneth L., to United States of America, Navy. Infrared background suppression. 4,048,500, Cl. 250-350.000.
Moppett, Charles E.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,048,304, Cl. 424-122.000.
Paul, Albertha M.; and Moppett, Charles E., 4,048,166, Cl. 544-215.000.
Paul, Albertha M.; and Moppett, Charles E., 4,048,167, Cl. 544-215.000.

Moreno, Elias A.: *See*—
Arnold, Bruce K.; and Moreno, Elias A., 4,047,797, Cl. 350-96.00C.
Morgan, Charles R.; and Kramm, David E., to W. R. Grace & Co. Flame retardant mercaptocarboxylic acid esters of halogenated aromatic polyols. 4,048,218, Cl. 560-147.000.
Morgan, Denny E.: *See*—
Crandall, Richard E.; and Morgan, Denny E., 4,048,620, Cl. 340-163.000.
Morgan, Paul F., to Xerox Corporation. Dual mode copying machine. 4,047,810, Cl. 355-3.00R.
Morgan, Paul Winthrop, to Du Pont de Nemours, E. I., and Company. Polyazomethine fibers and films. 4,048,148, Cl. 260-72.500.
Mori, Yasuki: *See*—
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Moring, Peter Lothar Ernst; and Raines, Kenneth William John, to Dunlop Limited. Reinforced elastomeric articles. 4,048,362, Cl. 428-36.000.
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, to Toyo Kogyo Co., Ltd. Furnace taphole drilling bit. 4,047,514, Cl. 125-40.000.
Morita, Katsuhiko: *See*—
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Morita, Kazuyuki: *See*—
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Morita, Tetsuro: *See*—
Ishii, Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, 4,048,656, Cl. 358-261.
Morita, Yasuji, to Kubota, Ltd. Burning method of ceramic shell mold for precision casting. 4,047,882, Cl. 432-9.000.
Moroux, Yvette Paule Nicole: *See*—
Boschetti, Egisto; Moroux, Yvette Paule Nicole; and Tixier, Rene, 4,048,377, Cl. 428-474.000.
Morris, Anne Winnifred: *See*—
Frost, Robert Walter; and Morris, Anne Winnifred, 4,047,399, Cl. 66-149.00R.
Morrison, Bernard H., to Noranda Mines Limited. Slimes treatment process. 4,047,939, Cl. 75-99.000.
Morriss, Harry Augustus; and Williamson, John Peter Hugh, to Keeling and Walker, Limited. Production of calcined ceramic pigments. 4,047,970, Cl. 106-299.000.
Mortimer, James R.: *See*—
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Jursa, Stephen J. D., 4,047,916, Cl. 65-106.000.
Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,048,176, Cl. 260-286.00R.
Mosebach Manufacturing Company: *See*—
Kirilloff, Victor V., 4,048,664, Cl. 361-89.000.
Mosky, George D., to Intalite International N.V. Method for manufacturing dimensionally-stable shaped articles. 4,048,278, Cl. 264-135.000.
Moss, Ernest K., to Celotex Corporation, The. Phenolic polymer prepared from o-cresol. 4,048,145, Cl. 260-57.00R.
Motoren- und Turbinen-Union Munchen GmbH: *See*—
Hueber, Alfred; and Buchs, Roland, 4,047,837, Cl. 416-95.000.
Motorola, Inc.: *See*—
Abt, Edgar John, 4,047,485, Cl. 102-80.000.
Bledsoe, Jerry L.; and Lund, Clarence A., 4,047,976, Cl. 148-1.500.
Bormann, Alan Richard, 4,048,629, Cl. 340-173.0CA.
Carson, Lansing M.; and Welter, Neil E., 4,048,566, Cl. 325-329.000.
Musa, Fuad H., 4,048,575, Cl. 330-22.000.
Rzeszewski, Theodore S., 4,048,652, Cl. 358-28.000.
Ulmer, Richard Walter, 4,048,584, Cl. 331-62.000.
Motz, Herbert: *See*—
Loewenberg, Gustav; Hartmann, Hans-Joerg; Schaefer, Dieter; Motz, Herbert; and Jakusch, Helmut, 4,048,375, Cl. 428-474.000.
Mowdood, Syed K., to Goodyear Tire & Rubber Company, The. N-(oxopropyl)amide derivatives. 4,048,227, Cl. 260-562.00P.
Moynihan, William N. Spray control system. 4,047,665, Cl. 239-124.000.
Mueller-Tamm, Heinz: *See*—
Frielingsdorf, Hans; Gruber, Wolfgang; and Mueller-Tamm, Heinz, 4,048,414, Cl. 526-106.000.
Mues, Volker; and Niggemann, Johannes, to Bayer Aktiengesellschaft. Treating micro-nutrient deficiencies in plants. 4,047,921, Cl. 71-11.000.
Mulholland, Stanley C., deceased; and Mulholland, Wanda E., administratrix. Roof structure of concrete edge-to-edge abutting panels and method of interconnecting same. 4,047,357, Cl. 52-90.000.
Mulholland, Wanda E., administratrix: *See*—
Mulholland, Stanley C., deceased; and Mulholland, Wanda E., administratrix, 4,047,357, Cl. 52-90.000.
Muller, Friedhelm: *See*—
Sackmann, Gunter; Kolb, Gunter; and Muller, Friedhelm, 4,048,422, Cl. 526-203.000.
Muller, Henry J., to Pitney-Bowes, Inc. Indexing attachment for a dividing head. 4,047,453, Cl. 74-813.00R.
Muller, Jens: *See*—
Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, 4,048,169, Cl 260-251.00R.
Muller, Klaus: *See*—
Koberstein, Edgar; Muller, Klaus; and Theissen, Ferdinand, 4,048,232, Cl. 260-601.00R.
Multinorm, B.V.: *See*—
Oosterling, Pieter Adriaan; and van Staveren, Hendricus Cornelis, 4,047,369, Cl. 56-295.000.
Mulvaney, Ronald J.; and Moore, Cecil L., to said Ronald J. Mulvaney; by said Cecil L. Moore, a part interest. Wind chill factor indicator. 4,047,431, Cl. 73-170.00R.
Mulvany, R. F., Jr. Apparatus for forming plastic articles. 4,047,869, Cl. 425-143.000.
Munk, Michael E. Sprinkler system for existing buildings. 4,047,570, Cl. 169-16.000.
Murakami, Heiichiro; and Okamoto, Tsuneo, to Taiyo Kaken Company, Ltd. Method for the purification of waste gas containing gaseous pollutants. 4,047,906, Cl. 55-79.000.
Murakami, Yasuo; Ushio, Masatoshi; and Matono, Hirokuni, to Glory Kogyo Kabushiki Kaisha. Wrapping paper storing device in a coin wrapping machine. 4,047,364, Cl. 53-389.000.
Murasawa, Kengo, to Hitachi, Ltd. Tuning type laser oscillator apparatus and laser radar system and laser communication system using the same. 4,048,585, Cl. 331-94.50C.
Murata, Tomoji: *See*—
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
Murdock, Robert H., to NEF Systems. Line rail construction. 4,047,703, Cl. 256-68.000.
Murphy, Charles F.: *See*—
Kukolja, Stjepan; and Murphy, Charles F., 4,048,162, Cl. 544-22.000.
Murphy, James R., to Pullman Incorporated. Integrated heavy oil cracking process utilizing catalyst separated from cracking in pretreating zone. 4,048,057, Cl. 208-89.000.
Musa, Fuad H., to Motorola, Inc. Operational amplifier. 4,048,575, Cl. 330-22.000.
Muskovac, Nicholas G.; and Formhals, Bruce I., to Vectrol, Inc. Three-phase SCR drive circuit using an opto-coupled pulse amplifier. 4,048,520, Cl. 307-252.00Q.
Muzychuk, Vladimir Romanovich: *See*—
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Mydels, John W., to Allis-Chalmers Corporation. Clamping arrangement for a flexible earth-working tine. 4,047,823, Cl. 403-188.000.
Myers, Bruce L.: *See*—
Johnson, Edgar A.; and Myers, Bruce L., 4,048,567, Cl. 325-363.000.
Myers, Robert A.: *See*—
Hoge, A. Russell; and Myers, Robert A., 4,048,274, Cl. 264-46.500.
Nachev, Lyubomir Todorov: *See*—
Kondratenko, Maria Stefanova; Nachev, Lyubomir Todorov; Dedova, Petrushka Atanassova; and Antonova, Tamara Nikolaevna, 4,048,339, Cl. 426-39.000.
Nagai, Shigeki; Iwata, Fumio; and Kubo, Kenzi, to UBE Industries, Ltd. Process for preparing o-alkoxy-p-allylphenols. 4,048,236, Cl. 260-613.00D.
Nagy, Edward John: *See*—
Orkin, Stanley S.; and Nagy, Edward John, 4,048,370, Cl. 428-323.000.
Nakagawa, Shiro, to TDK Electronics Co., Ltd. Video recording and reproducing system using Hadamard matrixing. 4,048,658, Cl. 360-9.000.
Nakagome, Keisuke; and Suzuki, Toshiharu, to Nitto Electric Industrial Co., Ltd. Process for producing a laminated metallic sheet. 4,048,005, Cl. 156-630.000.
Nakajima, Fumio; Machida, Takayasu; and Yamada, Kenji, to Citizen Watch Company Limited. Stepping motor. 4,048,548, Cl. 318-138.000.
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, to Nissan Motor Company, Limited. Exhaust gas recirculation system with control apparatus for exhaust gas flow control valve. 4,047,510, Cl. 123-119.00A.
Nakamachi, Akio; and Maruo, Zenichi, to Daicel Ltd. Process for preparing a foamed body having an annular ring pattern in cross-section. 4,048,101, Cl. 260-2.50E.
Nakamura, Kenji: *See*—
Yaguchi, Mashachika; and Nakamura, Kenji, 4,048,088, Cl. 252-299.000.
Nakamura, Minoru: *See*—
Ono, Masato; and Nakamura, Minoru, 4,047,361, Cl. 53-212.000.
Nakamura, Satoshi. Valve tuning system for the brass musical instruments. 4,047,459, Cl. 84-390.000.
Nakao, Hideo: *See*—
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,048,155, Cl. 542-422.000.
Nakos, Steven T.: *See*—
Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,048,107, Cl. 260-2.5AC.
Naphtachimie: *See*—
Caumartin, Francois; Raufast, Charles; and Havas, Laszlo, 4,048,412, Cl. 526-65.000.
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki;

Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, to Abbott Laboratories. Fortimicin C and process for production thereof. 4,048,015, Cl. 195-96.000.

Narahara, Hisaaki: *See—*
Tanaka, Yoshinori; Shinoda, Hajime; and Narahara, Hisaaki, 4,048,650, Cl. 358-1.000.

Natebusch, Roderich, to Siemens Aktiengesellschaft. Method for forming a conference connection in a telecommunication switching system. 4,048,449, Cl. 179-18.0BC.

National Research Development Corporation: *See—*
White, Martin; and Boonthanoom, Niyom, 4,048,349, Cl. 427-58.000.

National Semiconductor Corporation: *See—*
Laugesen, Ronald C.; and Shieu, Mark Shin-Dong, 4,048,524, Cl. 307-304.000.
Spadea, Gregorio, 4,047,284, Cl. 29-571.000.
Spadea, Gregorio, 4,047,285, Cl. 29-571.000.

National-Standard Company: *See—*
Mallory, Edwin F., 4,048,002, Cl. 156-403.000.

National Starch and Chemical Corporation: *See—*
Rutenberg, Morton W.; Jarowenko, Wadym; and Tessler, Martin M., 4,048,435, Cl. 536-106.000.

Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, to Bayer Aktiengesellschaft. Heterocyclic sulfonium salt containing plant-growth regulant compositions. 4,047,923, Cl. 71-76.000.

Nazuka, Iwao, to Bunri Kogyo Kabushiki Kaisha. Magnetic roller conveyor. 4,047,609, Cl. 198-690.000.

NBK Corporation: *See—*
Reams, Donald J., 4,048,645, Cl. 354-300.000.

NCR Corporation: *See—*
Lawter, Ray L.; Shooter, Kenneth L.; and Wills, David C., 4,048,476, Cl. 235-61.11D.
Sahni, Ram N., 4,047,538, Cl. 133-4.00R.

Nedenskov, Poul; and Alster, Karol, to Aktieselskabet Grindstedvaerket. Certain 8-(2-tetrahydrofuryl)octanoic acid compounds with prostaglandin like biological effects. 4,048,198, Cl. 260-347.400.

Neel, Jean: *See—*
Fritz, Jacques; Roux, Paul; and Neel, Jean, 4,048,149, Cl. 260-75.00S.

Neermolov, Alexandr Filippovich: *See—*
Volkov, Vladimir Vladimirovich; Bagryantsev, Gennady Ivanovich; Larionov, Igor Grigorievich; Neermolov, Alexandr Filippovich; and Leontievsky, Valery Georgievich, 4,047,672, Cl. 241-175.000.

NEF Systems: *See—*
Murdock, Robert H., 4,047,703, Cl. 256-68.000.

Neff, Marion W., to Recognition Equipment Incorporated. Retrace data elimination. 4,048,617, Cl. 340-146.3SY.

Neidhardt, Manfred: *See—*
Bockstiegel, Gerd-Edzard; Neidhardt, Manfred; and Rehfeld, Gerhard, 4,048,119, Cl. 252-521.000.

Nelson, Norman A., to Upjohn Company, The. 6α-Methoxy-4α-hydroxy-2β-hydroxymethyl-3α-tetrahydropyranacetic acid 4α γ-lactone ethers and acylates. 4,048,194, Cl. 260-343.600.

Nelson, Philip E.: *See—*
Rechtsteiner, Steve A.; Nelson, Philip E.; and Heron, John R., 4,047,547, Cl. 141-1.000.

Nelson, Robert Charles: *See—*
Shen, Kwan Ting; Gannon, John Allister; and Nelson, Robert Charles, 4,048,179, Cl. 260-29.40R.

Nenadal, Zdenek: *See—*
Hafner, Emanuel R.; and Nenadal, Zdenek, 4,048,446, Cl. 179-15.0AL.

Nenov, Dimiter Panayotov; and Danova, Verginia Ilieva, to VMEI "LENIN" — NIS Research Institution. Electrolytic process for silver oxidation. 4,048,025, Cl. 204-56.00R.

Neotechnic Engineering Limited: *See—*
Wilmot, Kenneth, 4,047,503, Cl. 119-75.000.

Neptune Eastech, Inc.: *See—*
Fussell, Theodore John, Jr., 4,047,432, Cl. 73-194.0VS.

Nett, Louis A. Ventilating apparatus. 4,047,519, Cl. 126-299.00D.

Neuray, Dieter: *See—*
Tresper, Erhard; Neuray, Dieter; and Freitag, Dieter, 4,048,200, Cl. 260-395.000.

Neuzil, Richard W.; and deRosset, Armand J., to UOP Inc. Process for separating an ester of a monoethanoid fatty acid. 4,048,205, Cl. 260-428.000.

Neuzil, Richard W.: *See—*
Rosback, Donald H.; and Neuzil, Richard W., 4,048,111, Cl. 252-455.00Z.

New Bedford Wire & Iron Company: *See—*
Benoit, Orient, 4,047,332, Cl. 49-236.000.

Newbury, Grant M.: *See—*
Gutridge, Jack E.; Marsh, Ronald W.; and Newbury, Grant M., 4,047,488, Cl. 105-315.000.

Ney, David Marshall, to Yoshida Kogyo Kabushiki Kaisha. Chair construction and method of assembling the same. 4,047,756, Cl. 297-219.000.

NGK Spark Plug Co., Ltd.: *See—*
Tanaka, Hiroshi; and Kato, Osamu, 4,047,897, Cl. 428-539.500.

Nichol, Kenneth J.: *See—*
Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

Nicholson, John S.: *See—*
Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., 4,048,332, Cl. 424-317.000.

Nickey, George A.: *See—*
Brummett, Marshall G.; Heckman, Russell W.; Nickey, George A.; and Taylor, James E., 4,048,281, Cl. 264-230.000.

Niedzinski, Edmund John: *See—*
Oser, Nathan; and Niedzinski, Edmund John, 4,047,417, Cl. 72-185.000.

Nielsen, John G.: *See—*
Hefferman, William; Hair, George R.; and Nielsen, John G., 4,047,358, Cl. 53-30.00R.

Nielsen, Mogens B.; Boa, Niels Halfdan; and Jensen, Jimmy, to H. Reinholdt A/S. Hammer drilling devices. 4,047,722, Cl. 279-19.500.

Niggemann, Johannes: *See—*
Mues, Volker; and Niggemann, Johannes, 4,047,921, Cl. 71-11.000.

Nigrin, Jan, to Canadian Patents and Development Limited. Locked hybrid junction power combiner. 4,048,583, Cl. 331-56.000.

Niimi, Hirozi: *See—*
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.

Nilson, Billy Nils. Spraying device. 4,047,642, Cl. 222-94.000.

Nippon Electric Company, Limited: *See—*
Maruta, Rikio, 4,048,447, Cl. 179-15.0AS.
Ogawa, Masaki; Furutsuka, Takashi; and Ishikawa, Masaoki, 4,048,646, Cl. 357-15.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Kobayashi, Haruhiko, 4,047,684, Cl. 248-122.000.

Nippon Kogaku K.K.: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,048,540, Cl. 315-241.00P.

Nippon Kokan Kabushiki Kaisha: *See—*
Adaniya, Takeshi; and Ohmura, Masaru, 4,048,381, Cl. 428-632.000.

Nippon Oil Company Ltd.: *See—*
Tsuchiya, Shozo; Hayashi, Hideo; and Oshima, Akio, 4,048,132, Cl. 260-33.6UA.

Nippon Steel Corporation: *See—*
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, 4,047,556, Cl. 164-57.000.
Yoshida, Katsuyoshi; and Kitajima, Yukio, 4,047,977, Cl. 148-6.200.

Nippon Zeon Co. Ltd.: *See—*
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,124, Cl. 260-5.000.
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,424, Cl. 526-237.000.

Nippondenso Co., Ltd.: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; and Hobo, Nobuhito, 4,047,507, Cl. 123-32.0Ea.

Nischk, Gunther: *See—*
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, 4,048,221, Cl. 260-512.00C.

Nishijima, Koji: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, 4,048,158, Cl. 260-239.100.

Nishimura, Hiroshi: *See—*
Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, 4,048,415, Cl. 526-119.000.

Nissan Motor Company, Limited: *See—*
Koike, Shyouichi, 4,047,751, Cl. 296-146.000.
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,047,510, Cl. 123-119.00A.

Niswender, Gordon Dean, to Rohm and Haas Company. Solid phase double-antibody radioimmunoassay procedure. 4,048,298, Cl. 424-1.500.

Nitto Electric Industrial Co., Ltd.: *See—*
Nakagome, Keisuke; and Suzuki, Toshiharu, 4,048,005, Cl. 156-630.000.

Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., to Halliburton Company. Weight and pressure operated well testing apparatus and its method of operation. 4,047,564, Cl. 166-72.000.

Nnadi, John C.; and Landis, Phillip S., to Mobil Oil Corporation. Organic lubricating compositions containing esters of benzotriazole. 4,048,082, Cl. 252-51.50A.

Noack, Wolfgang-Hermann, to Karl Schmidt GmbH. Locking means for piston pin. 4,047,471, Cl. 92-187.000.

Noehren, William Lawrence: *See—*
Ferris, Donald Leroy; and Noehren, William Lawrence, 4,047,839, Cl. 416-134.00A.

Noel, Stephane, to Solvay & Cie. Process for preventing build-up in polymerization reactors. 4,048,417, Cl. 526-62.000.

Noeske, Heinz Otto, to General Electric Company. Puffer-type gas-blast circuit breaker. 4,048,456, Cl. 200-148.00A.

Noguchi, Masaaki; Sumiyoshi, Masaharu; and Hobo, Nobuhito, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel economizing system. 4,047,507, Cl. 123-32.0Ea.

Nohe, Heinz: *See—*
Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, 4,048,047, Cl. 204-270.000.

Noranda Mines Limited: *See—*
Morrison, Bernard H., 4,047,939, Cl. 75-99.000.

Nordsiek, Karl-Heinz: *See—*
Haag, Horst; Nordsiek, Karl-Heinz; Streck, Roland; and Zerpner, Dieter, 4,048,262, Cl. 260-889.000.

Norfin, Inc.: *See—*
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., 4,047,713, Cl. 271-221.000.

Norman, Bill. Contoured wrist support. 4,047,250, Cl. 2-161.00A.

Northern Telecom Limited: *See—*
Gumb, Beverly William; Kuhfus, Gerd; and Cogan, Frederick Thomas, 4,047,787, Cl. 339-154.00A.
Pickar, Kenneth Arnold, 4,048,647, Cl. 357-22.000.
Notheisz, Ferenc: *See—*
Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.
Novello, Frederick C.: *See—*
Baldwin, John J.; and Novello, Frederick C., 4,048,183, Cl. 260-296.00R.
Nuclear Power Company (Whetstone Limited): *See—*
George, Brian Victor; and Drayrer, Colin James, 4,048,012, Cl. 176-60.000.
Numata, Saburo, to Fuji Photo Optical Co., Ltd. Warning device for a camera. 4,048,644, Cl. 354-60.00L.
Numberger, Christian Konrad. Installation for producing green malt from barley and/or for storing and continuously dispensing green malt. 4,048,019, Cl. 195-129.000.
Nurk, Siegfried, to Gottlieb Eppinger. Method for forming a closed toe. 4,047,401, Cl. 66-187.000.
Nussbaumer, Henri J., to International Business Machines Corporation. Digital filter generating a discrete convolution function. 4,048,485, Cl. 235-156.000.
Nutrilite Products, Inc.: *See—*
Gretz, Charles, 4,048,051, Cl. 206-1.500.
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, to Nippon Steel Corporation; and Hitachi Cable, Ltd. Continuous casting method. 4,047,556, Cl. 164-57.000.
O'Brian, Edward D., to Polytop Corporation. Child resistant dispensing closures. 4,047,495, Cl. 215-224.000.
O'Brien, Miguel Eugene: *See—*
Blevitt, Robert; and O'Brien, Miguel Eugene, 4,047,623, Cl. 214-17.00C.
Occidental Oil Shale, Inc.: *See—*
Ridley, Richard D., 4,047,760, Cl. 299-2.000.
O'Connor, Alton J.; and Schrinel, Thomas L., to Walbro Corporation. In-line pump construction. 4,047,852, Cl. 417-415.000.
Oda Gosen Kogyo Kabushiki Kaisha: *See—*
Takai, Isao, 4,047,373, Cl. 57-77.400.
Oehring, Hans; and Rossomando, Philip Joseph, to Bell Telephone Laboratories, Incorporated. Automatic call distribution system. 4,048,452, Cl. 179-27.00D.
Oelke, Waldemar W.; and Hagedorn, Floyd T., to Libbey-Owens-Ford Company. Apparatus for press bending relatively thin glass sheets. 4,047,919, Cl. 65-273.000.
Ogaki, Koji: *See—*
Tamura, Yukio; Hirosawa, Katsu; and Ogaki, Koji, 4,047,387, Cl. 61-13.000.
Ogawa, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ogawa, Akira, 4,047,964, Cl. 96-126.000.
Ogawa, Masaki; Furutsuka, Takashi; and Ishikawa, Masaoki, to Nippon Electric Company, Limited. Dual-gate Schottky barrier gate fet having an intermediate electrode and a method of making same. 4,048,646, Cl. 357-15.000.
Ogibayashi, Shigeaki: *See—*
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, 4,047,556, Cl. 164-57.000.
O'Hara, Mark J., to UOP Inc. Hydrodesulfurization catalyst and method of preparation. 4,048,115, Cl. 252-465.000.
Ohashi, Tsuneo: *See—*
Yanagida, Hiroaki; and Ohashi, Tsuneo, 4,047,971, Cl. 134-2.000.
Ohmura, Masaru: *See—*
Adaniya, Takeshi; and Ohmura, Masaru, 4,048,381, Cl. 428-632.000.
Ohno, Ryotaro: *See—*
Arakawa, Masatoshi; Ohno, Ryotaro; Ishikawa, Katuhiro; Yamahara, Noboru; and Matsui, Hisashi, 4,048,147, Cl. 260-67.0UA.
Ohzeki, Masanao: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.
Oi, Hidesaburo: *See—*
Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, 4,048,415, Cl. 526-119.000.
Oikawa, Kiyoshi: *See—*
Ishii, Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, 4,048,656, Cl. 358-261.
Oikawa, Kunihiro, to Iwaki Co., Ltd. Magnetically driven centrifugal pump. 4,047,847, Cl. 417-370.000.
Okachi, Ryo: *See—*
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Okamoto, Tsuneo: *See—*
Murakami, Heiichiro; and Okamoto, Tsuneo, 4,047,906, Cl. 55-79.000.
Okano, Yukio; Kita, Nobuyuki; and Uesugi, Kyozo, to Minolta Camera Kabushiki Kaisha. Diaphragm device. 4,047,807, Cl. 350-266.000.
Okumura, Sosuke, to Yutaka Denki Saisakusho. Dust collector for dental technician. 4,047,913, Cl. 55-418.000.
Okura, Masaatsu; Ota, Kazutoshi; and Otomi, Sadayuki, to Mitsubishi Denki Kabushiki Kaisha. Guide device for elevator. 4,047,597, Cl. 187-95.000.
O'Leary, Timothy J., deceased: *See—*
Kelleher, Raymond L.; Shirk, Ivan A.; and O'Leary, Timothy J., deceased, 4,048,287, Cl. 423-242.000.
Olesen, Ole V. Method and apparatus for timing intravenous liquid drip rate. 4,048,474, Cl. 235-151.340.
Olin Corporation: *See—*
Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,048,107, Cl. 260-2.5AC.
Knollmueller, Karl O., 4,048,083, Cl. 252-78.300.
Knollmueller, Karl O., 4,048,084, Cl. 252-78.300.
Parikh, Prakash D.; and Shapiro, Eugene, 4,047,978, Cl. 148-11.50C.
Saeman, Walter C.; and Coe, Noel N., 4,048,351, Cl. 427-213.000.
Watson, W. Gary; and Breedis, John F., 4,047,980, Cl. 148-12.70C.
Olsson, Olof Bertil: *See—*
Fredriksson, Lars Evert; Jacobson, Gunnar; and Olsson, Olof Bertil, 4,047,464, Cl. 89-1.811.
Olympus Optical Company, Ltd.: *See—*
Satoh, Ken, 4,048,549, Cl. 318-345.00F.
Omron Tateisi Electronics Company: *See—*
Yoshida, Shinya, 4,048,475, Cl. 235-61.70B.
Ono, Hiroshi: *See—*
Jidai, Eiki; Ono, Hiroshi; and Shibayama, Kyoichi, 4,048,379, Cl. 428-500.000.
Ono, Masato; and Nakamura, Minoru, to Glory Kogyo Kabushiki Kaisha. Wrapping paper supplying device in coin wrapping apparatus. 4,047,361, Cl. 53-212.000.
Ono, Yasutaka: *See—*
Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, 4,048,307, Cl. 424-180.000.
Onuma, Kazuhiko: *See—*
Matsushita, Kunichi; Sakurada, Hikaru; Onuma, Kazuhiko; and Fujii, Shinichi, 4,048,112, Cl. 252-461.000.
Ooba, Seiichi; and Hirayama, Shinichi, to Fuji Photo Film Co., Ltd. Adhesive coatings from ether-type polyester, urethane elastomer, and polyisocyanate. 4,048,253, Cl. 260-858.000.
Oosterling, Pieter Adriaan; and van Staveren, Hendricus Cornelis, to Multinorm, B.V. Mowing device. 4,047,369, Cl. 56-295.000.
Orkin, Stanley S.; and Nagy, Edward John, to Kamatics Corporation. Shaped bearing member. 4,048,370, Cl. 428-323.000.
Orme, Myrl E.; and Vick, Ralph L., to Bendix Corporation, The. Multi-path valve structure having extended life and backwashing capability. 4,047,540, Cl. 137-239.000.
Osborne, Eugene F., to United States of America, Navy. Carrier-modulated coherency monitoring system. 4,048,563, Cl. 325-58.000.
Oscarson, John R.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,048,304, Cl. 424-122.000.
Oser, Nathan; and Niedzinski, Edmund John, to Johns-Manville Corporation. Deeply embossed sheet product and method and apparatus for the production thereof. 4,047,417, Cl. 72-185.000.
Osher, Benjamin B., to Kleer-Vu Industries, Inc. Holder for photos and the like. 4,047,315, Cl. 40-102.000.
Oshima, Akio: *See—*
Tsuchiya, Shozo; Hayashi, Hideo; and Oshima, Akio, 4,048,132, Cl. 260-33.6UA.
Ostern, Sverre Ludvik, to Dyno Industrier A.S. Method for the recovery of blasting oil from effluents from the production of nitroglycerine-containing explosives. 4,047,989, Cl. 149-109.600.
Ota, Kazutoshi: *See—*
Okura, Masaatsu; Ota, Kazutoshi; and Otomi, Sadayuki, 4,047,597, Cl. 187-95.000.
Otis Engineering Corporation: *See—*
Crickmer, Charles D., 4,047,565, Cl. 166-217.000.
Otomi, Sadayuki: *See—*
Okura, Masaatsu; Ota, Kazutoshi; and Otomi, Sadayuki, 4,047,597, Cl. 187-95.000.
Ott, Hubert, to Mannesmann Aktiengesellschaft. Head for needle printer. 4,047,606, Cl. 197-1.00R.
Otte, Hubert Josef; and Roosman, Gosta. Bore hole probe. 4,047,306, Cl. 33-314.000.
Ottesen, Hjalmar Holmboe: *See—*
Dennison, James Clifford; and Ottesen, Hjalmar Holmboe, 4,048,660, Cl. 360-77.000.
Otto Bihler Maschinenfabrik GmbH & Co. KG: *See—*
Kopf, Johann, 4,048,461, Cl. 219-104.000.
Otto, Lucy A., to United States of America, Health, Education and Welfare. Identification of non-fermentative gram-negative bacteria. 4,048,016, Cl. 195-100.000.
Oulton, T. Dixon: *See—*
Isaac, Peter A. H.; and Oulton, T. Dixon, 4,047,738, Cl. 282-27.500.
Ours, Frank M. Electrically heated spreader assembly having a detachable blade. 4,048,471, Cl. 219-228.000.
Ovechkin, Alexandr Vasilievich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Owen, Daniel V.; and Knoble, David W., to General Electric Company. Discharge lamp operating circuit. 4,048,543, Cl. 315-205.000.
Owens-Illinois, Inc.: *See—*
Brummett, Marshall G.; Heckman, Russell W.; Nickey, George A.; and Taylor, James E., 4,048,281, Cl. 264-230.000.
Hinson, David C.; Bode, Wolfgang W.; Fein, Michael E.; and Hoehn, H. Joseph, 4,048,533, Cl. 313-188.000.
Lohmann, Larry John, 4,047,612, Cl. 206-454.000.

Taylor, Lynn J.; and Tobias, John W., 4,048,410, Cl. 526-22.000.
Oxy Metal Industries Corporation: *See*—
Stevens, Peter, 4,048,023, Cl. 204-44.000.
Ozaki, Nobuo, to Maeda Industries, Ltd. Multi-speed bicycle free wheel assembly. 4,047,603, Cl. 192-64.000.
Ozawa, Hiroshi: *See*—
Kobayashi, Sadao; Ozawa, Hiroshi; and Kobayashi, Nobuki, 4,048,136, Cl. 260-42.140.
Ozeki, Osamu: *See*—
Ito, Hajime; Yamanaka, Teruo; and Ozeki, Osamu, 4,048,613, Cl. 340-53.000.
Ozeki, Shigeru: *See*—
Ishida, Minoru; and Ozeki, Shigeru, 4,047,296, Cl. 30-41.000.
P. R. Mallory & Co. Inc.: *See*—
Bro, Per, 4,048,404, Cl. 429-199.000.
Pabsdorff, Melvin, to A/S Hymas. Excavator blade for replacing railroad sleepers. 4,047,486, Cl. 104-9.000.
Packard, Keith A.: *See*—
Wilcox, Glade; and Packard, Keith A., 4,048,561, Cl. 325-22.000.
Packer, Lester; and Bymun, Edwin N., to United States of America, Energy Research and Development Administration. Low toxicity method of inhibiting sickling of sickle erythrocytes. 4,048,325, Cl. 424-298.000.
Paetz, Eike: *See*—
Haferkamp, Dirk; Hodzic, Alija; Paetz, Eike; and Stach, Heinrich, 4,047,742, Cl. 285-187.000.
Pako Corportion: *See*—
Anderson, Conrad V., 4,047,445, Cl. 74-230.400.
Palette, Ralph John: *See*—
DeNigris, Ernest Gerard; and Palette, Ralph John, 4,047,781, Cl. 339-17.00R.
Palmberg, Paul W.: *See*—
Gerlach, Robert L.; and Palmberg, Paul W., 4,048,498, Cl. 250-305.000.
Palmer, William: *See*—
Balthes, John; Balthes, Garry; and Palmer, William, 4,047,366, Cl. 56-63.000.
Pammer, Gottfried; and Kvasnicka, Rudolf, to Vockenhuber, Karl; and Hauser, Raimund. Apparatus for adjusting the rotational speed of a drive mechanism. 4,047,442, Cl. 74-194.000.
Pandel-Bradford, Inc.: *See*—
Wisotzky, Reuben; and Bolger, John C., 4,048,269, Cl. 264-25.000.
Panicci, Richard L.: *See*—
McDonald, Quentin H.; and Panicci, Richard L., 4,047,755, Cl. 297-216.000.
Pankratov, Vladimir Alexeevich: *See*—
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Pannier, Karl A., Jr.: *See*—
Reynolds, Gordon S.; Pannier, Karl A., Jr.; and Sorenson, James L., 4,047,526, Cl. 128-214.00R.
Panoz, David M. Motorcycle frame. 4,047,730, Cl. 280-281.0LP.
Paoli High Fidelity Consultants Inc.: *See*—
Curcio, Joseph John, 4,048,523, Cl. 307-297.000.
Papantoniou, Christos, to L'Oreal. Hair dye composition containing a cationic resin. 4,047,888, Cl. 8-10.200.
Papantoniou, Christos, to L'Oreal. Shampoo composition containing a detergent and a graft cationic copolymer. 4,048,301, Cl. 424-70.000.
Paper, Calmenson & Co.: *See*—
Tronvold, Harlan C., 4,047,706, Cl. 266-49.000.
Paradis, Joseph R., to Dennison Manufacturing Company. Installation tool. 4,047,545, Cl. 140-123.600.
Pardo, Pierre; and Pruvot, Francois C., to SOFERMO. Robot head. 4,047,448, Cl. 74-417.000.
Parikh, Prakash D.; and Shapiro, Eugene, to Olin Corporation. Processing copper base alloys. 4,047,978, Cl. 148-11.50C.
Park, Ernest D.; and Dianetti, Joseph C., to American Optical Corporation. Optical relay for a microscope and a back aperture viewer therefor. 4,047,794, Cl. 350-54.000.
Parke, Davis & Company: *See*—
Baker, David Clarkston, 4,048,432, Cl. 536-26.000.
Parker, James A.: *See*—
Breznak, Robert A.; and Parker, James A., 4,048,277, Cl. 264-83.000.
Parkes, Alvin G., to Raymond Lee Organization, Inc., The, a part interest. Fifth wheel carrier hoist. 4,047,733, Cl. 280-402.000.
Parry, Keith Peter; and George, Edwin Francis, to Imperial Chemical Industries Limited. Regulating plant growth. 4,047,924, Cl. 71-76.000.
Pascaud, Xavier: *See*—
Beregi, Laszlo; Hugon, Pierre; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,321, Cl. 424-274.000.
Vincent, Michel; Remond, Georges; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,313, Cl. 424-248.500.
Pasquine, Arthur R.: *See*—
Spiers, Steven F.; Lewis, Howard M.; Kraft, Gerald A.; and Pasquine, Arthur R., 4,047,421, Cl. 73-1.00R.
Patel, Direj Vallabhbhai; and Ward, John Joseph Bernard, to International Lead Zinc Research Organization, Inc. Bright levelling zinc plating. 4,048,024, Cl. 204-55.00R.
Paterson, James G. T.; Watkins, Charles W.; and Duckworth, Grover G., Jr., to Interdye Technology Corporation. Method for space dyeing yarn. 4,047,271, Cl. 28-220.000.
Paul, Albertha M.; and Moppett, Charles E., to Dow Chemical Company, The. 3-Carboalkoxy (or phenoxy) and 3-thiocarbo-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1)nonane and preparation. 4,048,166, Cl. 544-215.000.
Paul, Albertha M.; and Moppett, Charles E., to Dow Chemical Company, The. N,N-disubstituted derivatives of 3-carboxamide or 3-thiocarboxamide-7-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1-)nonane and preparation II. 4,048,167, Cl. 544-215.000.
Pearl, Edgar W.: *See*—
Johns, Eddie D.; Cummings, Robert E.; and Pearl, Edgar W., 4,047,408, Cl. 70-129.000.
Pearre, Stephen G.; and Craighead, Bobby L., to Environmental Elements Corporation. Center column drive arrangement for circular clarifiers. 4,048,076, Cl. 210-528.000.
Peccoud nee Toupillier, Louise: *See*—
Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, 4,047,436, Cl. 73-362.0SC.
Pechiney Ugine Kuhlmann: *See*—
Kienzle, Jean Andre Paul, 4,048,189, Cl. 260-314.500.
Peck, Richard John; and Tong, Shih Yung, to Bell Telephone Laboratories, Incorporated. Asynchronous-to-synchronous data concentration system. 4,048,440, Cl. 178-69.100.
Pedershaab Maskinfabrik A/S: *See*—
Holme, Bent Melchior Karlsen, 4,047,693, Cl. 249-187.00R.
Pell, Kynric M.; and Brown, David B., to United States of America, Army. Attitude determination using two transmitter/receiver stations and skewed reflectors. 4,047,816, Cl. 356-152.000.
Pellegrin, Anna J.: *See*—
Adams, Guy Emery; and Pellegrin, Anna J., 4,047,513, Cl. 123-148.00E.
Pelzek, Victor J., to Browne Packaging, Inc. Adhesive laminated packaging materials. 4,048,378, Cl. 428-483.000.
Pelzer, Rudolf: *See*—
Heymes, Pierre Rene; and Pelzer, Rudolf, 4,047,917, Cl. 65-146.000.
Pemsler, J. Paul: *See*—
Rappas, Alkis S.; and Pemsler, J. Paul, 4,047,940, Cl. 75-108.000.
Penn, Laurence Richard. Metering piston pump with piston-carried distributor for viscous fluid. 4,047,854, Cl. 417-489.000.
Penn, Nathar W. Composition for antagonizing the narcotic effects of barbiturate addiction and withdrawal effects, and for treatment of barbiturate poisoning. 4,048,316, Cl. 424-251.000.
Pennwalt Corporation: *See*—
Guzzardo, George Paul, 4,047,959, Cl. 106-2.000.
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,048,423, Cl. 526-209.000.
Perciaccante, Vincent Anthony; and Landi, Henry Patrick, to American Cyanamid Company. Absorbable surgical sutures coated with polyoxyethylene-polyoxypropylene copolymer lubricant. 4,047,533, Cl. 128-335.500.
Perry, Robert W.: *See*—
Campbell, Richard A.; Sparks, Richard A.; and Perry, Robert W., 4,048,580, Cl. 331-1.00R.
Pertriaux, Jean-Pierre Felix, to Pont-A-Mousson S.A. Composite reinforced pipe union. 4,047,741, Cl. 285-55.000.
Petersen, Richard D.; and Mieville, Rodney L., to Standard Oil Company (Indiana). Methods to be used in reforming processes employing multi-metallic catalysts. 4,048,058, Cl. 208-138.000.
Peterson, James F., to Allis-Chalmers Corporation. Attachment for collecting mower discharge in a plurality of bags. 4,047,368, Cl. 56-202.000.
Petrolite Corporation: *See*—
May, Walter R.; Zetlmeisl, Michael J.; and Koch, Kenneth W., 4,047,875, Cl. 431-3.000.
Redmore, Derek, 4,048,264, Cl. 260-929.000.
Unmuth, George E., 4,048,376, Cl. 428-461.000.
Petterson, Tor H. Device and method for unclogging drains. 4,047,253, Cl. 4-255.000.
Pettit, Ernest E., to Sell, W. Leon; Pettit, Ernest E.; and Sell, R. Don. Upgrading current distribution insulators. 4,047,279, Cl. 29-426.000.
Peuzin, Jean Claude: *See*—
Challeton, Didier; Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,047,801, Cl. 350-96.0WG.
Pews, R. Garth: *See*—
Mixan, Craig E.; and Pews, R. Garth, 4,048,213, Cl. 260-465.00F.
Pfaff, Maurice Edgar, to Eastman Kodak Company. Imagewise soluble silver salt intensification of diffusion transfer silver images. 4,047,952, Cl. 96-29.00R.
Pfaff, Maurice Edgar, to Eastman Kodak Company. Color diffusion transfer employing silver salt transfer reversal and 4-thiohydantoine. 4,047,953, Cl. 96-29.00D.
Pfeifer, Raymond; and Ringger, Roger. Knockdown put-together article of furniture. 4,047,777, Cl. 312-263.000.
Pfister, Gustav R.; and Williams, David J., to Xerox Corporation. Xeroprinting master and process. 4,047,945, Cl. 96-1.00R.
Pfister, William H., to Pfister, William R. Fish lure. 4,047,317, Cl. 43-42.060.
Pfister, William R.: *See*—
Pfister, William H., 4,047,317, Cl. 43-42.060.
Pfizer Inc.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,048,304, Cl. 424-122.000.

Pfleger, Klaus: *See*—
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boettcher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.
Philip Morris Incorporated: *See*—
Spiers, Steven F.; Lewis, Howard M.; Kraft, Gerald A.; and Pasquine, Arthur R., 4,047,421, Cl. 73-1.00R.
Philip, Thomas. Purification of lutein-fatty acid esters from plant materials. 4,048,203, Cl. 260-412.800.
Philippar, Donald T. Combination sheath and rigid handle for knife blades and the like. 4,047,298, Cl. 30-153.000.
Phillips, Jack L.; and Dickinson, Timothy E. Vacuum forcep and method of using same. 4,047,532, Cl. 128-303.00R.
Phillips Petroleum Company: *See*—
Cheng, Paul J., 4,048,063, Cl. 210-72.000.
Cheng, Paul J., 4,048,067, Cl. 210-73.00R.
Clampitt, Richard L.; and Hessert, James E., 4,048,079, Cl. 252-8.55D.
Cobb, Raymond L., 4,048,209, Cl. 260-464.000.
Fuller, Edward N., 4,047,892, Cl. 23-232.00C.
Gardner, Lloyd E.; Fahey, Darryl R.; and Mahan, John E., 4,048,238, Cl. 260-618.00R.
Solomon, Paul W., 4,048,426, Cl. 526-334.000.
Vanderveen, John W., 4,047,896, Cl. 23-314.000.
Phillipson, Ronald Frederick: *See*—
Berg, Samuel Sidney; Jenkins, David Conwil; and Phillipson, Ronald Frederick, 4,048,326, Cl. 424-300.000.
Physical Electronics Industries, Inc.: *See*—
Gerlach, Robert L.; and Palmberg, Paul W., 4,048,498, Cl. 250-305.000.
Pickar, Kenneth Arnold, to Northern Telecom Limited. Solid state disconnect device. 4,048,647, Cl. 357-22.000.
Piepho, Donald A.: *See*—
May, Czeslaw J.; and Piepho, Donald A., 4,047,542, Cl. 137-627.500.
Pierres, Sergio Ortega, to Fertilizantes Fosfatados Mexicanos, S.A. Stabilization of wet-process phosphoric acid. 4,048,289, Cl. 423-317.000.
Pieters, Eli, to Lawrence Peska Associates, Inc., a part interest. Reflecting device. 4,047,802, Cl. 350-97.000.
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, to Labaz. Active derivatives of methylamino in therapeutic compositions and methods of use. 4,048,334, Cl. 424-325.000.
Pignocco, Arthur J.; and Kachik, Robert H., to United States Steel Corporation. Method of producing a refractory lining in a cylinder or tube. 4,048,352, Cl. 427-234.000.
Pinchock, Donald E., to Metcom Products Company. Truck assembly for a skate-like device. 4,047,725, Cl. 280-11.280.
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, to Hoechst Atiengesellschaft. Benzoxazole derivatives, process for their preparation and their use as optical brighteners. 4,048,185, Cl. 260-307.00D.
Piper, Hugh V.: *See*—
Vaughn, Kennith E.; and Piper, Hugh V., 4,047,771, Cl. 308-237.00R.
Pitney-Bowes, Inc.: *See*—
Dlugos, Daniel F., 4,047,585, Cl. 177-210.00R.
Dlugos, Daniel F., 4,047,586, Cl. 177-210.00R.
Muller, Henry J., 4,047,453, Cl. 74-813.00R.
Pittenger, Daniel I.: *See*—
Bowler, John W.; Karner, Kenneth E.; Pittenger, Daniel I.; and Schwartz, Donald A., 4,048,669, Cl. 361-391.000.
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, to International Flavors & Fragrances Inc. Novel enol esters. 4,048,201, Cl. 260-410.000.
Pittinger, Charles B., Sr. Method and apparatus for sharpening end of filament in vegetation filament-trimmer. 4,047,455, Cl. 76-82.100.
Platt, Jeremy A.: *See*—
Baird, William G., Jr.; Holbrook, Stanley E.; and Platt, Jeremy A., 4,048,428, Cl. 526-343.000.
Plaxico, Robert E.: *See*—
Stout, James T.; and Plaxico, Robert E., 4,047,610, Cl. 206-187.000.
Plech, John, Jr. Peg game with spinner-type timer. 4,047,716, Cl. 273-1.00R.
Plugge, Jerome R. Hydrotherapeutic apparatus. 4,047,522, Cl. 128-66.000.
Plunkett, Joseph A.: *See*—
Chuang, Ping-chien; and Plunkett, Joseph A., 4,048,615, Cl. 340-146.3AC.
Poignant, Jean-Claude: *See*—
Beregi, Laszlo; Hugon, Pierre; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,321, Cl. 424-274.000.
Vincent, Michel; Remond, Georges; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,313, Cl. 424-248.500.
Polaroid Corporation: *See*—
Greenwald, Richard B., 4,047,954, Cl. 96-29.00R.
Greenwald, Richard B., 4,047,955, Cl. 96-29.00R.
Stephens, Robert K., 4,047,804, Cl. 350-164.000.
Wolff, Otto E., 4,047,289, Cl. 29-623.400.
Politechnika Warszawska: *See*—
Ratajczyk, Eugeniusz; Goscimski, Januariusz; and Jedrzejewski, Adam, 4,047,305, Cl. 33-172.00R.
Pollard, Leslie John; and Stewart, Donald Fergusson, to ICI Australia Limited. Beneficiation of the non-ferrous metal values of oxide-containing materials. 4,047,934, Cl. 75-29.000.
Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Dehydrogenation method and nonacidic multimetallic catalytic composite for use therein. 4,048,245, Cl. 260-668.00D.
Polytechnic Institute of New York: *See*—
Sforza, Pasquale M., 4,047,832, Cl. 415-1.000.
Polytop Corporation: *See*—
Hazard, Robert E., 4,047,643, Cl. 222-153.000.
O'Brian, Edward D., 4,047,495, Cl. 215-224.000.
Pomeroy, Bruce D.; and Kosky, Philip G., to General Electric Company. Flow control device for superconductive rotor refrigerant. 4,048,529, Cl. 310-54.000.
Pont-A-Mousson S.A.: *See*—
Pertriaux, Jean-Pierre Felix, 4,047,741, Cl. 285-55.000.
Poole, Eric John, to Compair Industrial Limited. Centrifugal compressors. 4,047,848, Cl. 417-374.000.
Pope & Talbot, Inc.: *See*—
Postman, John R.; and Bottorff, Elwin G., 4,047,344, Cl. 52-390.000.
Popov, Valentin Alexeevich. Globoid worm gearing and method of making globoid worm thereof. 4,047,449, Cl. 74-458.000.
Poppe, Wassily W.: *See*—
Keske, Robert G.; Poppe, Wassily W.; and Fielding, Ivor R., 4,048,131, Cl. 260-33.20R.
Poppel, Eugene H.: *See*—
Hart, Donald J.; Bouton, John C., Jr.; and Poppel, Eugene H., 4,048,616, Cl. 340-146.3ED.
Porath, Jerker Olof: *See*—
Axen, Rolf Erik Axel Verner; Porath, Jerker Olof; and Carlsson, Per Jan Erik, 4,048,416, Cl. 526-9.000.
Porret, Daniel; and Habermeier, Jurgen, to Ciba-Geigy Corporation. Dialkoxyphosphonoalkyl derivatives of dihydrouracils. 4,048,170, Cl. 260-256.40E.
Porter, David Edward. Mounting bracket for radios in vehicles. 4,047,686, Cl. 248-203.000.
Post, Beverley C.: *See*—
Mitchell, Earl R.; Brown, Thomas D.; and Post, Beverley C., 4,047,879, Cl. 431-183.000.
Postman, John R.; and Bottorff, Elwin G., to Pope & Talbot, Inc. Wood veneer wall covering. 4,047,344, Cl. 52-390.000.
Potomac Applied Mechanics, Inc.: *See*—
Stubbings, James Henry, 4,047,457, Cl. 83-71.000.
Poujois, Robert: *See*—
Barbier, Daniel; Ittel, Jean-Michel; and Poujois, Robert, 4,048,574, Cl. 330-9.000.
Powell, Justin Christopher, to Texaco Inc. Method for preparing a lactone reaction product. 4,047,899, Cl. 44-63.000.
Powell, Truman W. Push pull type exercising device. 4,047,714, Cl. 272-116.000.
Powers, Edward J.: *See*—
Calundann, Gordon W.; and Powers, Edward J., 4,048,139, Cl. 260-45.80N.
PPG Industries, Inc.: *See*—
Bartrug, Norman G.; and McDaniel, Donald L., 4,047,429, Cl. 73-150.00R.
Heithoff, Robert B., 4,047,918, Cl. 65-179.000.
Prucnal, Paul J., 4,048,036, Cl. 204-159.230.
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Jursa, Stephen J. D., 4,047,916, Cl. 65-106.000.
Tsai, Yih-Wan, 4,047,560, Cl. 165-9.300.
Pracht, Hans J.: *See*—
Burns, Michael E.; and Pracht, Hans J., 4,048,433, Cl. 536-99.000.
Prazska akumulatorka, narodni podnik: *See*—
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.
Prepost, Kalman: *See*—
Toth, Laszlo; Schirhuber, Janos; Prepost, Kalman; and Tassi, Andras, 4,048,466, Cl. 219-121.0EM.
Prescher, Gunter; and Schreyer, Gerd, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of pure racemic acid and mesotartaric acid. 4,048,225, Cl. 260-536.000.
Prive, Leonel. Vehicle suspension. 4,047,736, Cl. 280-683.000.
Procter & Gamble Company, The: *See*—
Burns, Michael E.; and Pracht, Hans J., 4,048,433, Cl. 536-99.000.
Produits Chimiques Ugine Kuhlmann: *See*—
Boschetti, Egisto; Moroux, Yvette Paule Nicole; and Tixier, Rene, 4,048,377, Cl. 428-474.000.
Propp, Carl F. Oil and waste water reception facility and process. 4,048,070, Cl. 210-85.000.
Prucnal, Paul J., to PPG Industries, Inc. Process for producing films of low gloss by exposure to ultraviolet light. 4,048,036, Cl. 204-159.230.
Prueter, Elton D.: *See*—
McMaster, Elmer L.; Grenley, Dallas G.; and Prueter, Elton D., 4,048,000, Cl. 156-304.000.
Pruvot, Francois C.: *See*—
Pardo, Pierre; and Pruvot, Francois C., 4,047,448, Cl. 74-417.000.
Pryce-Jones, Alan, to Holt, Jeremy Bruce, a part interest. Method of making a structural element. 4,048,273, Cl. 264-46.500.
Pryce, Robert J.: *See*—
Bond, Richard P. M.; Pryce, Robert J.; Raven, Clive A.; and Venis, Michael A. J., 4,047,928, Cl. 71-88.000.
Puel, Jean-Pierre, to Realist, Inc. Hand held microfiche viewer. 4,047,806, Cl. 350-236.000.
Pullman Incorporated: *See*—
Gutridge, Jack E.; Marsh, Ronald W.; and Newbury, Grant M., 4,047,488, Cl. 105-315.000.
Murphy, James R., 4,048,057, Cl. 208-89.000.

Whaley, Robert L.; and Day, James L., 4,047,748, Cl. 296-35.00A.
Quaker Oats Company, The: *See*—
Balaz, Alexander, 4,047,861, Cl. 425-7.000.
Quigley, James R., to TRW Inc. Wire terminating tool. 4,047,294, Cl. 29-749.000.
Quigley, Richard J.: *See*—
Reynolds, Clarke; and Quigley, Richard J., 4,047,663, Cl. 238-304.000.
Quinn, Edward J., to Hooker Chemicals & Plastics Corporation. Apparatus for electroplating plastic insulating cable sheaths. 4,048,042, Cl. 204-206.000.
Quinn, William T., III. Snap action frame for facial identification system. 4,047,307, Cl. 35-28.000.
Quock, Billy; Kelley, Don Howard; and Warneke, Sehon Lester, to Dow Chemical Company, The. Process for preparing flexible polyurethane foams. 4,048,102, Cl. 260-2.5AM.
R. W. Frost Limited: *See*—
Frost, Robert Walter; and Morris, Anne Winnifred, 4,047,399, Cl. 66-149.00R.
Radek, John R., to Ready Metal Manufacturing Company. Bicycle rack. 4,047,614, Cl. 211-20.000.
Radowski, Stanley P. Animal waste removing device. 4,047,746, Cl. 294-55.000.
Rae, James A.: *See*—
Baldwin, Francis P.; Rae, James A.; and Ver Strate, Gary, 4,048,258, Cl. 260-879.000.
Raider, Stanley Irwin: *See*—
Glang, Reinhard; and Raider, Stanley Irwin, 4,048,350, Cl. 427-93.000.
Raines, Kenneth William John: *See*—
Moring, Peter Lothar Ernst; and Raines, Kenneth William John, 4,048,362, Cl. 428-36.000.
Randall, Alfred R.: *See*—
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.
Rappas, Alkis S.; and Pemsler, J. Paul, to Kennecott Copper Corporation. Separation and recovery of copper metal from ammoniacal solutions. 4,047,940, Cl. 75-108.000.
Rasile, John: *See*—
Bakos, Peter; Memis, Irving; and Rasile, John, 4,048,356, Cl. 427-379.000.
Rasp, Christian: *See*—
Botta, Artur; and Rasp, Christian, 4,048,174, Cl. 260-283.0SY.
Rast, Gustaf J., Jr.; Barley, Thomas A.; Hammond, Raiford L.; and Ashley, James R., to United States of America, Army. Wide operating frequency range superheterodyne FM noise analyzer. 4,048,568, Cl. 325-363.000.
Ratajczyk, Eugeniusz; Goscimski, Januariusz; and Jedrzejewski, Adam, to Politechnika Warszawska. Link mechanism of a mechanical transducer, especially of a toothed amplifying gauge. 4,047,305, Cl. 33-172.00R.
Ratelle, Clement; and Rouillard, Pierre, to Ratelle, Clement. Log barking and cleaning machine. 4,047,549, Cl. 144-208.00D.
Rathbone, Ronald; and Rydval, Peter, to Siemens Aktiengesellschaft. Logic element. 4,048,517, Cl. 307-213.000.
Rattmann, Rudolf: *See*—
Soldner, Richard Ernst; and Rattmann, Rudolf, 4,047,520, Cl. 128-2.00V.
Rau, Willy; and Taus, Christian, to Maschinenfabrik Rau OHG. Cultivator wheel for agricultural machines. 4,047,576, Cl. 172-540.000.
Raufast, Charles: *See*—
Caumartin, Francois; Raufast, Charles; and Havas, Laszlo, 4,048,412, Cl. 526-65.000.
Rauschenfels, Eberhard: *See*—
zurStrassen, Heinrich; and Rauschenfels, Eberhard, 4,047,968, Cl. 106-281.00R.
Rautenstrauch, Valentin, to Firmenich S.A. Method of improving, enhancing or modifying perfume using cyclobutane derivatives. 4,048,120, Cl. 252-522.000.
Raven, Clive A.: *See*—
Bond, Richard P. M.; Pryce, Robert J.; Raven, Clive A.; and Venis, Michael A. J., 4,047,928, Cl. 71-88.000.
Ravenhall, Richard; Salemme, Charles T.; and Adamson, Arthur P., to United States of America, National Aeronautics and Space Administration. Impact absorbing blade mounts for variable pitch blades. 4,047,840, Cl. 416-135.000.
Ray, Martin George: *See*—
Brookes, Neil Roger; Ray, Martin George; Cohen, Joseph David; and McCarey, Thomas Joseph, 4,047,379, Cl. 60-39.09D.
Raymond, Fernand. Powder fluidizer with feed for constant powder level. 4,047,644, Cl. 222-193.000.
Raymond Lee Organization, Inc., The: *See*—
DeAngelis, Gloria J., 4,047,717, Cl. 273-95.00H.
DiBease, Paul J., 4,047,800, Cl. 350-99.000.
Hall, Lester W., 4,047,458, Cl. 83-439.000.
Hendry, Seth T., 4,048,618, Cl. 340-146.30E.
Lundahl, Robert O., 4,047,825, Cl. 404-70.000.
McNeary, Richard C., 4,047,744, Cl. 292-171.000.
Parkes, Alvin G., 4,047,733, Cl. 280-402.000.
Rice, Loyal E., Sr., 4,048,565, Cl. 325-114.000.
Sajkovic, Miriam D., 4,047,719, Cl. 273-130.00R.
Raynaud, Guy M.: *See*—
Fauran, Claude P.; Raynaud, Guy M.; Turin, Michel J.; and Thomas, Janine M., 4,048,164, Cl. 544-121.000.
RCA Corporation: *See*—
Ettenberg, Michael; and Lockwood, Harry Francis, 4,048,627, Cl. 357-17.000.
Haferl, Peter Eduard, 4,048,544, Cl. 315-408.000.
Knight, Stanley Paul; and Molinari, Thomas Edward, 4,048,597, Cl. 334-15.000.
Knight, Stanley Paul, 4,048,598, Cl. 334-15.000.
Reade, Richard F., to Corning Glass Works. Refractory partially crystalline materials with good visible transparency. 4,047,960, Cl. 106-39.800.
Ready Metal Manufacturing Company: *See*—
Radek, John R., 4,047,614, Cl. 211-20.000.
Realist, Inc.: *See*—
Puel, Jean-Pierre, 4,047,806, Cl. 350-236.000.
Reams, Donald J., to NBK Corporation. Diazo emulsion processor. 4,048,645, Cl. 354-300.000.
Reash, Clair Wilbur: *See*—
Madden, Thomas Harry; and Reash, Clair Wilbur, 4,048,545, Cl. 316-2.000.
Rechtsteiner, Steve A.; Nelson, Philip E.; and Heron, John R. Method of filling, sampling and sealing an aseptic tank. 4,047,547, Cl. 141-1.000.
Recker, Kurt: *See*—
Haussuehl, Siegfried; and Recker, Kurt, 4,048,514, Cl. 307-88.300.
Recognition Equipment Incorporated: *See*—
Chuang, Ping-chien; and Plunkett, Joseph A., 4,048,615, Cl. 340-146.3AC.
Neff, Marion W., 4,048,617, Cl. 340-146.3SY.
Red Dot Corporation: *See*—
Forsythe, Alan K.; and Green, Charles J., 4,048,455, Cl. 200-81.400.
Redifon Limited: *See*—
Spooner, Archer Michael, 4,048,653, Cl. 358-104.000.
Redmore, Derek, to Petrolite Corporation. Polymeric phosphoramides. 4,048,264, Cl. 260-929.000.
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Jursa, Stephen J. D., to PPG Industries, Inc. Method and apparatus for bending glass sheets to double V-bends. 4,047,916, Cl. 65-106.000.
Reeve, Paul H., to Auto Research Corporation. Cyclic pump. 4,047,845, Cl. 417-251.000.
Regal Tool & Rubber Co., Inc.: *See*—
Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., 4,047,391, Cl. 61-94.000.
Regan, Michael T.: *See*—
Rossi, Louis J.; and Regan, Michael T., 4,047,944, Cl. 96-1.200.
Regie Nationale des Usines Renault: *See*—
Arnaud, Henry, 4,047,509, Cl. 123-119.00A.
Rivere, Jean-Pierre, 4,048,479, Cl. 235-150.210.
Regnaut, Bernard, to Societe Generale de Constructions Electriques et Mecaniques "Alsthom et Cie". Cross-feed fuel cell battery with filter press type structure of cylindrical cross-section. 4,048,385, Cl. 429-34.000.
Rehfeld, Gerhard: *See*—
Bockstiegel, Gerd-Edzard; Neidhardt, Manfred; and Rehfeld, Gerhard, 4,048,119, Cl. 252-521.000.
Reis, August: *See*—
Eibl, Volker; and Reis, August, 4,048,044, Cl. 204-257.000.
Reliance Electric Company: *See*—
Eddy, Robert Truman, 4,047,452, Cl. 74-752.00C.
Remley, Kenneth Herald, to American Cyanamid Company. Polyurethane textile adhesive. 4,048,001, Cl. 156-331.000.
Remond, Georges: *See*—
Vincent, Michel; Remond, Georges; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,313, Cl. 424-248.500.
Renault, Philippe; Deschamps, Andre; Franckowiak, Sigismond; and Dezael, Claude, to Institut Francais du Petrole. Process for purifying a sulfur dioxide containing gas. 4,048,293, Cl. 423-574.00L.
Republic Steel Corporation: *See*—
Eschenauer, Paul R.; and Main, George, 4,047,881, Cl. 431-215.000.
Reuter, Wolfgang: *See*—
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.
Rexnord Inc.: *See*—
Dieringer, Andrew M.; and Sheperd, Ervin M., 4,047,280, Cl. 29-427.000.
Reynolds, Clarke; and Quigley, Richard J. Rail plate having spring clips and lateral positioning means. 4,047,663, Cl. 238-304.000.
Reynolds, Gordon S.; Pannier, Karl A., Jr.; and Sorenson, James L., to Sorenson Research Co., Inc. Autologous blood system and method. 4,047,526, Cl. 128-214.00R.
Rheinstahl AG: *See*—
Wilckens, Hellmut; and Wetzel, Helmut, 4,047,579, Cl. 175-7.000.
Rhone-Poulenc Industries: *See*—
Fritz, Jacques; Roux, Paul; and Neel, Jean, 4,048,149, Cl. 260-75.00S.
Rhone-Poulenc S.A.: *See*—
Chabardes, Pierre; Julia, Marc; and Menet, Albert, 4,048,234, Cl. 260-607.0AR.
Ribaldone, Giuseppe; and Borsotti, Giampiero, to Montedison S.p.A. Heterocyclic polynuclear pigments and process for preparing same. 4,048,173, Cl. 260-272.000.
Ribka, Joachim; Rieper, Wolfgang; and Schwerin, Siegfried, to Hoechst Aktiengesellschaft. Modified form of disazo pigment CI 20040. 4,048,152, Cl. 260-176.000.
Rice, Loyal E., Sr., to Raymond Lee Organization, Inc., The, a part interest. Location indicating device. 4,048,565, Cl. 325-114.000.

Rice, Richard E., to Comstock & Wescott, Inc. Catalytic fuel combustion apparatus and method. 4,047,876, Cl. 431-7.000.
Richard Rath Packaging Machinery, Inc.: *See*—
Vigneri, Alfonso, 4,047,363, Cl. 53-371.000.
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Belke, William H.; Hafele, Joseph C.; Landen, Ernest W.; and Richards, Thomas J., 4,047,984, Cl. 148-152.000.
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Sill, Arthur D.; and Sweet, Francis W., 4,048,230, Cl. 260-570.50C.
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Appleman, William S., 4,047,578, Cl. 173-152.000.
Appleman, William S., 4,047,582, Cl. 175-122.000.
Richter Gedeon Vegyeszeti Gyar Rt.: *See*—
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Riddell, Robert G.: *See*—
Blakey, Rene C.; Riddell, Robert G.; Whittaker, John; and Wilson, John A., 4,048,380, Cl. 428-511.000.
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Riff Rite, Inc.: *See*—
Fiedler, Mark A.; and Hart, Darrell M., 4,047,460, Cl. 84-422.00S.
Rigg, Ralph R.: *See*—
Hanson, Robert S.; and Rigg, Ralph R., 4,047,393, Cl. 62-428.000.
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Hansen, Torben Christen; and Ringsholt, Thomas, 4,048,276, Cl. 264-79.000.
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Gormish, Kenneth J.; Hofelt, Clarence, Jr.; Lavecchia, Silvano Anthony; and Ripley, Clarence Arthur, Jr., 4,047,338, Cl. 51-106.00R.
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Hesse, Wolfgang; Ritz, Jurgen; and Teschner, Eckart, 4,047,903, Cl. 51-298.00R.
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Robinson, Thomas C., to Searle Cardio-Pulmonary Systems Inc. Blood pumping system. 4,047,844, Cl. 417-3.000.
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Wilcox, Glade; and Packard, Keith A., 4,048,561, Cl. 325-22.000.
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Bake, Earl A.; and Stephens, Leonard J., 4,047,275, Cl. 29-157.10R.
Chen, Thomas T., 4,048,557, Cl. 324-46.000.
Keith, John L., 4,047,435, Cl. 73-362.0SC.
Lai, San-Cheng, 4,048,395, Cl. 429-112.000.
McElwain, John Christee; and Hogan, Lawrence Howard, 4,047,396, Cl. 64-17.00A.
Spence, John R., 4,048,632, Cl. 340-324.00R.
Rodriguez-M, German: *See*—
Liebig, William J.; and Rodriguez-M, German, 4,047,252, Cl. 3-1.400.
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Roessler, Peter: *See*—
Bredereck, Hellmut; Kantlehner, Willi; Kugel, Wolfgang; Mohring, Edgar; and Roessler, Peter, 4,048,315, Cl. 424-249.000.
Rohm and Haas Company: *See*—
Machleder, Warren H.; and Bollinger, Joseph M., 4,048,081, Cl. 252-51.50R.
Niswender, Gordon Dean, 4,048,298, Cl. 424-1.500.
Rohr, Eduard. Deck chair. 4,047,752, Cl. 297-19.000.
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Rolls-Royce (1971) Limited: *See*—
Brownhill, Frank Denison, 4,047,682, Cl. 244-110.00B.
Smith, Thomas Eric, 4,047,381, Cl. 60-226.00A.
Romovacek, George R., to Koppers Company, Inc. Method and apparatus for the control of pitch operation. 4,048,020, Cl. 196-132.000.
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Rones, James M. Mop wringer. 4,047,261, Cl. 15-261.000.
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Otte, Hubert Josef; and Roosman, Gosta, 4,047,306, Cl. 33-314.000.
Rosback, Donald H.; and Neuzil, Richard W., to UOP Inc. Method for manufacturing an adsorbent useful for olefin separation. 4,048,111, Cl. 252-455.00Z.
Rosch, Gunter: *See*—
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,048,185, Cl. 260-307.00D.
Rose, Lawrence J., to Helix Technology Corporation. Filter bed assembly. 4,048,073, Cl. 210-284.000.
Rosenvold, Leo. Golf practice swing apparatus. 4,047,605, Cl. 194-1.00R.
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Rossmaier, Emmy, heiress: *See*—
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Oehring, Hans; and Rossomando, Philip Joseph, 4,048,452, Cl. 179-27.00D.
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Axer, Heinrich; and Roth, Gerd, 4,047,865, Cl. 425-80.000.
Rothbauer, Horst, to Maxs AG. Method and apparatus for interconnecting stacked electrodes of batteries. 4,048,397, Cl. 429-131.000.
Rouillard, Pierre: *See*—
Ratelle, Clement; and Rouillard, Pierre, 4,047,549, Cl. 144-208.00D.
Rousseau, Victor. Electrically powered vehicle and feed cart. 4,047,599, Cl. 191-12.20A.
Roussel Ulcaf: *See*—
Krief, Alain; and Hevesi, Laszlo, 4,048,215, Cl. 560-124.000.
Routien, John B.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,048,304, Cl. 424-122.000.
Roux, Paul: *See*—
Fritz, Jacques; Roux, Paul; and Neel, Jean, 4,048,149, Cl. 260-75.00S.
Rowbotham, Philip Martin: *See*—
Anderson, Brian; Dalton, Raymond Frederick; and Rowbotham, Philip Martin, 4,048,187, Cl. 260-308.00D.
Rowe, E. Riley: *See*—
Fletcher, Wade D.; and Rowe, E. Riley, 4,047,473, Cl. 93-36.00B.
Royko, Patricia Diane. Information demonstration device. 4,047,309, Cl. 35-60.000.
Ruckel, Erwin Richard: *See*—
Wojcik, Ronald Thomas; and Ruckel, Erwin Richard, 4,048,095, Cl. 252-429.00R.
Ruckelshauss, Gerhard, to Chemische Werke Huls Aktiengesellschaft. Method for the production of ethylbenzene. 4,048,243, Cl. 260-668.00D.
Rueppel, Melvin L., to Monsanto Company. Treatment of sugarcane with N-(perfluoroacyl)-N-phosphonomethyl glycine. 4,047,926, Cl. 71-86.000.
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Zona, Michael R.; Ruffing, Charles R.; and Johrde, Paul S., 4,047,867, Cl. 425-117.000.
Ruhrchemie Aktiengesellschaft: *See*—
Falbe, Jurgen; and Hahn, Heinz-Dieter, 4,048,233, Cl. 260-604.0HF.
Rupp, Louis William, Jr.; and Walsh, Walter Michael, Jr., to Bell Telephone Laboratories, Incorporated. Spin resonance spectrometer and magnet structure. 4,048,555, Cl. 324-.5MA.
Ruppel, Carl E.: *See*—
Falkowski, Edward C.; and Ruppel, Carl E., 4,047,983, Cl. 148-105.000.
Rusco Industries, Inc.: *See*—
Riegelman, Harry M., 4,047,333, Cl. 49-450.000.
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Russell, Michael King; and Russell, Anthony William, 4,047,439, Cl. 73-516.00R.
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Rydval, Peter: *See*—
Rathbone, Ronald; and Rydval, Peter, 4,048,517, Cl. 307-213.000.
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Rzeszewski, Theodore S., to Motorola, Inc. Automatic hue control system. 4,048,652, Cl. 358-28.000.
S. C. Johnson & Son, Inc.: *See—*
Lo, Mei-Kuo; and Sheppard, Erwin, 4,047,646, Cl. 222-402.130.
Sachs-Systemtechnik GmbH: *See—*
Eibl, Volker, 4,048,032, Cl. 204-151.000.
Eibl, Volker; and Reis, August, 4,048,044, Cl. 204-257.000.
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Suzaka, Yukinori; and Saeda, Shigeru, 4,048,118, Cl. 252-518.000.
Saeman, Walter C.; and Coe, Noel N., to Olin Corporation. Granular calcium hypochlorite coated with a low melting inorganic salt by spray graining. 4,048,351, Cl. 427-213.000.
Safi-Societe des Accumulateurs Fixes et de Traction: *See—*
Chevet, Robert, 4,048,388, Cl. 429-91.000.
Sagawa, Masato; Sakai, Takeaki; Sasaki, Tatsuji; and Henmi, Zenzo, to Fujitsu Limited. Permanent magnet and process for producing the same. 4,047,982, Cl. 148-101.000.
Sahm, Hermann: *See—*
Wagner, Fritz; and Sahm, Hermann, 4,048,013, Cl. 195-49.000.
Sahni, Ram N., to NCR Corporation. Change dispensing apparatus. 4,047,538, Cl. 133-4.00R.
Saint-Gobain Industries: *See—*
Heymes, Pierre Rene; and Pelzer, Rudolf, 4,047,917, Cl. 65-146.000.
Saito, Takeo; and Seki, Youichi, to Seiko Koki Kabushiki Kaisha. Exposure time control device of electric shutter for camera. 4,048,642, Cl. 354-23.00D.
Saito, Tsuyoshi; and Asano, Kiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for preparing trans-4-aminomethyl-cyclohexane-1-carboxylic acid. 4,048,222, Cl. 260-514.00J.
Sajkovic, Miriam D., to Raymond Lee Organization, Inc., The, a part interest. Board game apparatus. 4,047,719, Cl. 273-130.00R.
Sakai, Takeaki: *See—*
Sagawa, Masato; Sakai, Takeaki; Sasaki, Tatsuji; and Henmi, Zenzo, 4,047,982, Cl. 148-101.000.
Sakata, Okitsugu, to Agency of Industrial Science & Technology. Method for suppressing chatter vibrations in a machine tool. 4,047,469, Cl. 90-11.00C.
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, to Mitsui Petrochemical Industries Ltd.; and Toa Paint Co. Ltd. Process for the formation of a polyolefin coating layer onto a metal surface. 4,048,355, Cl. 427-375.000.
Sakurada, Hikaru: *See—*
Matsushita, Kunichi; Sakurada, Hikaru; Onuma, Kazuhiko; and Fujii, Shinichi, 4,048,112, Cl. 252-461.000.
Salemme, Charles T.: *See—*
Ravenhall, Richard; Salemme, Charles T.; and Adamson, Arthur P., 4,047,840, Cl. 416-135.000.
Salgo, Francis John. Method of making a mobile ion film memory. 4,047,999, Cl. 156-280.000.
Salisbury, Wayne C., to McCord Corporation. High density urethane foam for rim. 4,048,105, Cl. 260-2.5AC.
Samide, Frank Richard, to Towmotor Corporation. Overhead guard-battery ballast. 4,047,750, Cl. 296-107.000.
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, to Prazska akumulatorka, narodni podnik. Electrode for a rechargeable electrochemical current source, and method of making same. 4,048,406, Cl. 429-209.000.
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Brokmann, Manfred; Sanders, Kurt; Sanders, Dieter; and Westhoff, Hermann, 4,047,824, Cl. 403-209.000.
Sanders, Kurt: *See—*
Brokmann, Manfred; Sanders, Kurt; Sanders, Dieter; and Westhoff, Hermann, 4,047,824, Cl. 403-209.000.
Sandoz Ltd.: *See—*
Henzi, Beat, 4,048,151, Cl. 260-156.000.
Van Assche, Daniel, 4,048,153, Cl. 260-193.000.
Sangamo Electric Company: *See—*
McCollum, Samuel C., 4,048,605, Cl. 336-176.000.
Sankyo Company Limited: *See—*
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, 4,048,155, Cl. 542-422.000.
Sano, Shunichi, to Tokyo Shibaura Electric Co., Ltd. Liquid crystal driving system. 4,048,633, Cl. 340-324.00M.
Santo, Vladimir Rezhevich: *See—*
Karpov, Valentin Mikhailovich; Santo, Vladimir Rezhevich; Yanovsky, Viktor Yakovlevich; Mikhailov, Anatoly Ivanovich; and Belyaev, Mikhail Fedorovich, 4,047,428, Cl. 73-141.00A.
Sanyo Electric Co., Ltd.: *See—*
Sumi, Yasuaki, 4,048,570, Cl. 325-459.000.
Sapunarow, Michail: *See—*
Weitze, Artur; and Sapunarow, Michail, 4,047,290, Cl. 29-625.000.
Saruwatari, Minoru, to Canadian Foremost Ltd. Pump jack device. 4,047,384, Cl. 60-372.000.
Sasaki, Juntaro: *See—*
Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, 4,048,415, Cl. 526-119.000.
Sasaki, Tatsuji: *See—*
Sagawa, Masato; Sakai, Takeaki; Sasaki, Tatsuji; and Henmi, Zenzo, 4,047,982, Cl. 148-101.000.
Sasaki, Tohru: *See—*
Yoshikawa, Shinsuke; Terasaki, Syuuzi; and Sasaki, Tohru, 4,047,998, Cl. 156-275.000.
Sasaki, Yasuharu: *See—*
Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, 4,048,307, Cl. 424-180.000.
Sasse, Klaus: *See—*
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,047,923, Cl. 71-76.000.
Sassmannshausen, Gunter C.: *See—*
Lahme, Norbert Wilhelm; and Sassmannshausen, Gunter C., 4,048,387, Cl. 429-50.000.
Sata, Yoshiteru: *See—*
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, 4,047,958, Cl. 96-87.00R.
Sato, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ogawa, Akira, 4,047,964, Cl. 96-126.000.
Sato, Hisato: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.
Sato Koki K.K.: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,048,540, Cl. 315-241.00P.
Sato, Moriyuki: *See—*
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Satoh, Ken, to Olympus Optical Company, Ltd. Circuit for eliminating current noises from d.c. motor. 4,048,549, Cl. 318-345.00F.
Sauer, Hans; and Czerny, Thomas, to Varta Batterie Aktiengesellschaft. Vibratory spiral conveyor chute and a resistance heating element. 4,048,472, Cl. 219-388.000.
Saunders, Arthur G.: *See—*
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., 4,047,713, Cl. 271-221.000.
Saunders, Kenneth Worden, to American Cyanamid Company. Method of making copper catalyst on a support. 4,048,114, Cl. 252-463.000.
Saunders, Philip G., to Container Graphics Corporation. Apparatus for printing indicia on corrugated board and the like. 4,047,481, Cl. 101-376.000.
Savin, Alexandr Nikolaevich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Savin, Nikolai Ivanovich: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Sbrocca, Dino A.: *See—*
Falterman, Charles W.; and Sbrocca, Dino A., 4,047,990, Cl. 149-19.200.
Schaefer, Dieter: *See—*
Loewenberg, Gustav; Hartmann, Hans-Joerg; Schaefer, Dieter; Motz, Herbert; and Jakusch, Helmut, 4,048,375, Cl. 428-474.000.
Schaeffer, Hans-Joachim: *See—*
Bertram, Jurgen; Brand, Wilhelm; and Schaeffer, Hans-Joachim, 4,047,671, Cl. 241-66.000.
Schafer, Helmut: *See—*
Bergmann, Rolf; Hoheisel, Klaus; Schafer, Helmut; and Unger, Manfred, 4,048,150, Cl. 260-75.00T.
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Dietrich, Bernhard, 4,048,600, Cl. 335-128.000.
Scheid, Lloyd J. Wall or ceiling panel construction. 4,047,347, Cl. 52-436.000.
Scheidel, Fritz: *See—*
Lob, Udo; and Scheidel, Fritz, 4,047,286, Cl. 29-578.000.
Schenk, Norbert: *See—*
Lauer, Hubert; Schenk, Norbert; and Schwerdtel, Wulf, 4,048,242, Cl. 260-666.00A.
Schering Aktiengesellschaft: *See—*
Kulessa, Gerhard; and Mommertz, Elmar, 4,047,525, Cl. 128-208.000.
Scherrer, Robert A., to Riker Laboratories, Inc. Antimicrobial (2-nitro-3-benzofuranyl)-benzoic acids. 4,048,323, Cl. 424-285.000.
Schierer, Gunter, to Siemens Aktiengesellschaft. Interruption-free power supply. 4,048,553, Cl. 363-57.000.
Schilling, Franz, to Siempelkamp Giesserei KG. Pressure vessel especially for a nuclear reactor. 4,047,632, Cl. 220-3.000.
Schinzel, Erich: *See—*
Pintschovius, Ulrich; Schinzel, Erich; and Rosch, Gunter, 4,048,185, Cl. 260-307.00D.

Schioler, Holger: *See*—
Bruel, Per Wilhelm; Schioler, Holger; and Jensen, Johannes Tejlgaard, 4,047,516, Cl. 126-270.000.
Schirhuber, Janos: *See*—
Toth, Laszlo; Schirhuber, Janos; Prepost, Kalman; and Tassi, Andras, 4,048,466, Cl. 219-121.0EM.
Schlimper, Hans-Ulrich: *See*—
Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, 4,048,135, Cl. 260-40.00R.
Schlumberger Technology Corporation: *See*—
Ellis, Darwin V., 4,048,495, Cl. 250-264.000.
Schmid, Rolyn A.: *See*—
Bender, Lloyd F.; and Schmid, Rolyn A., 4,047,500, Cl. 119-14.110.
Schmidt, Dennis L.: *See*—
Doorakian, George A.; Schmidt, Dennis L.; and Cornell, Martin C., III, 4,048,141, Cl. 260-47.0EC.
Schmidt, Robert R.; Eue, Ludwig; and Draber, Wilfried, to Bayer Aktiengesellschaft. Synergistic herbicidal compositions. 4,047,929, Cl. 71-93.000.
Schneider, Sally W.: *See*—
Knox, Betty C.; and Schneider, Sally W., 4,047,688, Cl. 248-451.000.
Schnoeller, Manfred: *See*—
Martin, Joachim; Haas, Ernst; and Schnoeller, Manfred, 4,048,508, Cl. 250-492.00A.
Scholz, Manfred, to Kraftwerk Union Aktiengesellschaft. Motor-driven screwing and transporting tool for reactor pressure vessel head retaining fastenings. 4,047,456, Cl. 81-57.380.
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Schramm, George R., to Avco Corporation. Cooling air distribution system for reciprocating aircraft engines. 4,047,508, Cl. 123-41.600.
Schramm, Inc.: *See*—
McCullough, J. Robert, 4,048,072, Cl. 210-220.000.
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Prescher, Gunter; and Schreyer, Gerd, 4,048,225, Cl. 260-536.000.
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O'Connor, Alton J.; and Schrinel, Thomas L., 4,047,852, Cl. 417-415.000.
Schuessler, John C.; and Tapp, David J., to Leach Corporation. Switch mounting assembly for an electromagnetic relay. 4,048,601, Cl. 335-193.000.
Schuetz, Adolph August, to Combustion Engineering, Inc. Density control system. 4,047,891, Cl. 23-230.00A.
Schultz, Charles A., Jr.: *See*—
Forman, Aubry S., Jr.; Schultz, Charles A., Jr.; and Vice, William E., 4,048,619, Cl. 340-154.000.
Schultz, Rudiger: *See*—
Eschenfelder, Gunther; and Schultz, Rudiger, 4,048,010, Cl. 176-36.00R.
Schumacher, Hans: *See*—
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Schwartz, Edwin L., to Rite Autotronics Corporation. Electrical meter apparatus. 4,048,560, Cl. 324-115.000.
Schwartz, Henry D. Clinical testing apparatus. 4,048,040, Cl. 204-195.00R.
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Broecker, Franz Josef; and Schwarzmann, Matthias, 4,048,196, Cl. 260-346.110.
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Lauer, Hubert; Schenk, Norbert; and Schwerdtel, Wulf, 4,048,242, Cl. 260-666.00A.
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Vincent, Michel; Remond, Georges; Pascaud, Xavier; and Poignant, Jean-Claude, 4,048,313, Cl. 424-248.500.
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Cardenas, Carlos G., 4,048,220, Cl. 560-237.000.
Frondorf, William A., 4,047,386, Cl. 60-654.000.
Stevenson, Donald R., 4,048,257, Cl. 260-862.000.
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Seabrook, Terence Dale. Clothes drier latch. 4,047,616, Cl. 211-183.000.
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Robinson, Thomas C., 4,047,844, Cl. 417-3.000.
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Seidel, Gustave. Telephone handset support device. 4,048,453, Cl. 179-156.00R.
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Seitzer, Walter H., to Suntech, Inc. Manufacture of hydrogen. 4,048,029, Cl. 204-129.000.
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Pettit, Ernest E., 4,047,279, Cl. 29-426.000.
Sell, W. Leon: *See*—
Pettit, Ernest E., 4,047,279, Cl. 29-426.000.
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Serratto, Angelo. Terminal unit for the outlet of conditioned air in a centralized conditioning system. 4,047,662, Cl. 236-49.000.
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Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, 4,048,135, Cl. 260-40.00R.
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Shaffer, Robert H. Collapsible utility cart. 4,047,724, Cl. 280-5.220.
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Shapiro, Eugene: *See*—
Parikh, Prakash D.; and Shapiro, Eugene, 4,047,978, Cl. 148-11.50C.
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Stary, William Richard; and Shaw, David Merrill, 4,047,572, Cl. 169-62.000.
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Bond, Richard P. M.; Pryce, Robert J.; Raven, Clive A.; and Venis, Michael A. J., 4,047,928, Cl. 71-88.000.
Davis, Royston H., 4,048,210, Cl. 260-465.00F.
Kerr, Michael W., 4,047,930, Cl. 71-95.000.
Kruka, Vitold R., 4,047,539, Cl. 137-13.000.
Shen, Kwan Ting; Gannon, John Allister; and Nelson, Robert Charles, to Ciba-Geigy Corporation. Process for preparing water-dilutable, heat-curing coating compositions. 4,048,179, Cl. 260-29.40R.
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Dieringer, Andrew M.; and Sheperd, Ervin M., 4,047,280, Cl. 29-427.000.
Sheppard, Chester Stephen: *See*—
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,048,423, Cl. 526-209.000.
Sheppard, Erwin: *See*—
Lo, Mei-Kuo; and Sheppard, Erwin, 4,047,646, Cl. 222-402.130.
Sherard, Hoyt, Jr.: *See*—
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.
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Shibazaki, Kenji: *See*—
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
Shieu, Mark Shin-Dong: *See*—
Laugesen, Ronald C.; and Shieu, Mark Shin-Dong, 4,048,524, Cl. 307-304.000.
Shiino, Kazuo: *See*—
Kusakabe, Masao; Fuziwara, Shuzo; and Shiino, Kazuo, 4,047,987, Cl. 149-37.000.
Shimizu, Shigemitsu: *See*—
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
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Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Shindarov, Lubomir Mihaylov: *See*—
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
Shindo, Takemasa; and Arai, Kenichiro, to Shinshu Seiki Kabushiki Kaisha; and Kabushiki Kaisha Suwa Seikosha. Exothermic printing head. 4,048,470, Cl. 219-216.000.
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Shinoda, Hajime: *See*—
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Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,124, Cl. 260-5.000.
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Shinshu Seiki Kabushiki Kaisha: *See*—
Shindo, Takemasa; and Arai, Kenichiro, 4,048,470, Cl. 219-216.000.
Shiota, Toshiaki: *See*—
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, 4,048,275, Cl. 264-54.000.
Shirk, Ivan A.: *See*—
Kelleher, Raymond L.; Shirk, Ivan A.; and O'Leary, Timothy J., deceased, 4,048,287, Cl. 423-242.000.
Shirotsuka, Mikio: *See*—
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 4,047,803, Cl. 350-160.0LC.
Shiryaev, Vladimir Ivanovich: *See*—
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.
Shoffner, James P., to UOP Inc. Substituted cyanamidic compounds. 4,048,228, Cl. 260-566.00R.
Shooter, Kenneth L.: *See*—
Lawter, Ray L.; Shooter, Kenneth L.; and Wills, David C., 4,048,476, Cl. 235-61.11D.
Showa Denko K.K.: *See*—
Suzaka, Yukinori; and Saeda, Shigeru, 4,048,118, Cl. 252-518.000.
Shumway, Harry J. Low tire pressure warning device. 4,048,614, Cl. 340-58.000.
Shuster, Edward J.: *See*—
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,048,201, Cl. 260-410.000.
Sibley, Murray J.; Yung, Gordon H. K.; and Urrea, Petronio D., to Barnes-Hind Pharmaceuticals, Inc. Cleaning agents for contact lenses. 4,048,122, Cl. 252-541.000.
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Hramchenko, Jack; and Sibley, Murray J., 4,048,123, Cl. 252-545.000.
Siddiqui, Khalid U.: *See*—
Von Bargen, John D.; and Siddiqui, Khalid U., 4,048,668, Cl. 361-235.000.
Sieber, Adolf, to Sulzer Brothers Limited. Gamma-irradiation treatment apparatus. 4,048,509, Cl. 250-522.000.
Sieber, Charles W.; Knutson, Richard K.; and Johnston, John W., to United States of America, Navy. Self-driven underwater noisemaking device. 4,047,592, Cl. 181-142.000.
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Auracher, Franz, 4,048,591, Cl. 332-7.510.
Gudden, Friedrich; and Weiss, Herbert, 4,048,502, Cl. 250-370.000.
Haussuehl, Siegfried; and Recker, Kurt, 4,048,514, Cl. 307-88.300.
Hoffmann, Kurt; Meusburger, Guenther; and Wotruba, Gottfried, 4,048,519, Cl. 307-221.00D.
Kuhl, Dieter, 4,047,894, Cl. 23-284.000.
Kunze, Dieter, 4,047,283, Cl. 29-466.000.
Lob, Udo; and Scheidel, Fritz, 4,047,286, Cl. 29-578.000.
Martin, Joachim; Haas, Ernst; and Schnoeller, Manfred, 4,048,508, Cl. 250-492.00A.
Natebusch, Roderich, 4,048,449, Cl. 179-18.0BC.
Rathbone, Ronald; and Rydval, Peter, 4,048,517, Cl. 307-213.000.
Schierer, Gunter, 4,048,553, Cl. 363-57.000.
Soldner, Richard Ernst; and Rattmann, Rudolf, 4,047,520, Cl. 128-2.00V.
Weitze, Artur; and Sapunarow, Michail, 4,047,290, Cl. 29-625.000.
Widmann, Dietrich, 4,047,975, Cl. 148-1.500.
Siempelkamp Giesserei KG: *See*—
Schilling, Franz, 4,047,632, Cl. 220-3.000.
SIG Schweizerische Industrie-Gesellschaft: *See*—
Bolli, Hans-Ulrich, 4,048,003, Cl. 156-515.000.
Sighinolfi, Orazio: *See*—
de Ruggieri, Pietro; and Sighinolfi, Orazio, 4,048,159, Cl. 260-239.55R.
Signal Science Systems, Inc.: *See*—
Kolm, Eric A.; and Trottier, Robert R., 4,048,596, Cl. 334-8.000.
Sill, Arthur D.; and Sweet, Francis W., to Richardson-Merrell Inc. Aminoacetyl-acenaphthenes. 4,048,230, Cl. 260-570.50C.
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Haaf, Franz; Hatzmann, Guenter; Herrle, Karl; and Simak, Petr, 4,048,260, Cl. 260-884.000.
Simpson, David A., to Hercules Incorporated. Photopolymer compositions. 4,047,963, Cl. 96-115.00R.
Sinanan Enterprises Limited: *See*—
Delaney, Francis Alfred, 4,047,641, Cl. 222-80.000.
Sinclair, Brett Jason: *See*—
Ziofsky, Henry; and Sinclair, Brett Jason, 4,047,303, Cl. 32-40.00R.
Singer Company, The: *See*—
Buess, Kenneth G.; and Hefter, Murray, 4,048,531, Cl. 310-49.00R.
Johnson, Edgar A.; and Myers, Bruce L., 4,048,567, Cl. 325-363.000.
Sinke, Gerard C.; Langhorst, Martin A.; and May, James A., Sr., to Dow Chemical Company, The. Method for preventing evaporation-condensation caking of sodium chloride at high temperatures. 4,048,288, Cl. 423-267.000.
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Cahn, Robert P.; and Siskin, Michael, 4,048,251, Cl. 260-683.680.
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Miller, Walter E., Jr.; Duke, Jimmy R.; and Sitton, Robert L., 4,047,678, Cl. 244-3.160.
SKF Industrial Trading and Development Company, B.V.: *See*—
Hallerback, Stig Lennart; and Lachonius, Leif, 4,048,527, Cl. 310-43.000.
Korenhof, Abraham; and Kapaan, Hendrikus Jan, 4,047,770, Cl. 308-191.000.
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, to Slovenska Vysoka Skola Technicka. Method of and apparatus for forming sheets of fibrous material between converging sieves. 4,048,008, Cl. 162-104.000.
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Sloan, Donald A.: *See*—
King, J. Frank; and Sloan, Donald A., 4,047,272, Cl. 29-2.190.
Slovenska Vysoka Skola Technicka: *See*—
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,048,008, Cl. 162-104.000.
Smaldone, Fulvio. Automatic podiatric control molder. 4,047,870, Cl. 425-151.000.
Smetkin, Jury Alexandrovich: *See*—
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.
Smith, Edward Earl, to Geode Industries, Inc. Method of vibratory polishing of stones and the like. 4,047,343, Cl. 51-313.000.
Smith, Gary L.: *See*—
DeWeese, Harry R.; and Smith, Gary L., 4,047,668, Cl. 239-500.000.
Smith, Gordon A.; and Talcott, James M., to Fairchild Industries, Inc. High load extendible structure. 4,047,339, Cl. 52-108.000.
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Smith, John L.: *See*—
Horton, Norman H.; and Smith, John L., 4,048,284, Cl. 423-112.000.
Smith Kline & French Laboratories: *See*—
Gordon, Maxwell; and Lafferty, John J., 4,048,178, Cl. 260-293.540.
Smith Kline & French Laboratories Limited: *See*—
Black, James Whyte; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,048,319, Cl. 424-269.000.
Smith Kline Instruments, Inc.: *See*—
Goldberg, Paul R., 4,047,819, Cl. 356-205.000.
Smith, Thomas Eric, to Rolls-Royce (1971) Limited. Gas turbine engine power plants for aircraft. 4,047,381, Cl. 60-226.00A.
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Berges, David A., 4,048,311, Cl. 424-246.000.
Colella, Donald F.; and Kaiser, Carl, 4,048,229, Cl. 260-570.600.
Cooper, David J.; Hoover, John R. E.; and Weisbach, Jerry A., 4,048,430, Cl. 536-17.000.
Smorzaniuk, Adam, to Amerace Corporation. Circuit breaker. 4,048,607, Cl. 337-53.000.
Snam Progetti S.P.A.: *See*—
Cernia, Enrico; and Conti, Walter, 4,047,702, Cl. 256-13.100.
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., to Norfin, Inc. Sheet jogger. 4,047,713, Cl. 271-221.000.

Snover, John A.: *See*—
Daniels, Roger D.; and Snover, John A., 4,048,087, Cl. 252-188.000.
Societa Italiana Vetro Siv S.p.A.: *See*—
Ciarniello, Giorgio; and De Lena, Oscar, 4,048,469, Cl. 219-203.000.
s.a. Texaco Belgium n.v.: *See*—
Hermans, Johny C., 4,048,106, Cl. 260-2.5AV.
Van Neste, Walter, 4,047,922, Cl. 71-28.000.
Societe d'Assistance Technique Pour Produits Nestle S.A.: *See*—
Gasser, Rupert Josef; and Watercutter, Steven N., 4,048,344, Cl. 426-385.000.
Societe d'Equipements Divers Pour la Population Civile et l'Aviation Sedpa: *See*—
Decroix, Paul Marcel Edmond, 4,047,679, Cl. 244-16.000.
Societe France-Americaine de Constructions Atomiques-Framatome: *See*—
Weilbacher, Jean-Claude, 4,048,009, Cl. 176-19.00R.
Societe Generale de Constructions Electriques et Mecaniques "Alsthom et Cie": *See*—
Chillier-Duchatel, Nicole; and Verger, Bernard, 4,048,384, Cl. 429-22.000.
Regnaut, Bernard, 4,048,385, Cl. 429-34.000.
Societe Lyonnaise des Applications Catalytiques S.A.: *See*—
Risse, Roger Paul Pierre, 4,048,113, Cl. 252-462.000.
Societe Nouvelle de Roulements: *See*—
Druge, Gerard; and Troccaz, Roger, 4,047,414, Cl. 72-91.000.
SOFERMO: *See*—
Pardo, Pierre; and Pruvot, Francois C., 4,047,448, Cl. 74-417.000.
Sogi, Toshiyuki: *See*—
Maeda, Muneyoshi; Watanabe, Shigeo; Takahashi, Hidenori; and Sogi, Toshiyuki, 4,047,552, Cl. 152-361.00R.
Sokol, Michael: *See*—
Eichelberger, James W.; Kent, Frederick M.; and Sokol, Michael, 4,047,890, Cl. 23-230.00B.
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Haselwood, Donald E.; Solar, Carl M.; and Thumm, Jeffrey R., 4,048,562, Cl. 325-31.000.
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Adams, Guy; and Goldman, Scott D., 4,048,541, Cl. 315-248.000.
Adams, Guy Emery; and Pellegrin, Anna J., 4,047,513, Cl. 123-148.00E.
Solomon, Paul W., to Phillips Petroleum Company. Crosslinking in emulsion polymerization. 4,048,426, Cl. 526-334.000.
Solvay & Cie.: *See*—
Noel, Stephane, 4,048,417, Cl. 526-62.000.
Sonntag, Hans: *See*—
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,047,351, Cl. 52-616.000.
Sonoco Products Company: *See*—
Fletcher, Wade D.; and Rowe, E. Riley, 4,047,473, Cl. 93-36.00B.
Sony Corporation: *See*—
Tanaka, Yoshinori; Shinoda, Hajime; and Narahara, Hisaaki, 4,048,650, Cl. 358-1.000.
Yamatani, Wataru, 4,048,569, Cl. 325-414.000.
Soodak, Charles; Lessner, David L.; and Macemon, James H., to Baxter Travenol Laboratories, Inc. Constant temperature, multiple sample, rotary changer. 4,047,820, Cl. 356-244.000.
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Reynolds, Gordon S.; Pannier, Karl A., Jr.; and Sorenson, James L., 4,047,526, Cl. 128-214.00R.
Sorenson Research Co., Inc.: *See*—
Reynolds, Gordon S.; Pannier, Karl A., Jr.; and Sorenson, James L., 4,047,526, Cl. 128-214.00R.
Source Gas Analyzers, Inc.: *See*—
Von Bargen, John D.; and Siddiqui, Khalid U., 4,048,668, Cl. 361-235.000.
Southco, Inc.: *See*—
Bisbing, Robert H., 4,047,266, Cl. 24-221.00R.
Sowa, Tsuneo: *See*—
Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, 4,048,307, Cl. 424-180.000.
Sowman, Harold G.: *See*—
Karst, Karl A.; and Sowman, Harold G., 4,047,965, Cl. 106-65.000.
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Campbell, Richard A.; Sparks, Richard A.; and Perry, Robert W., 4,048,580, Cl. 331-1.00R.
Speakman, Edwin L., to Standard Brands Incorporated. Method for preparing an acid modified oxidized hydroxyalkyl starch. 4,048,434, Cl. 536-105.000.
Speedfam Corporation: *See*—
McNamara, David M.; and Boettcher, Stephen A., 4,047,639, Cl. 222-64.000.
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Speer, Billy L., to Dayco Corporation. Endless power transmission belt. 4,047,446, Cl. 74-234.000.
Spence-Bate, Harry Arthur Hele. Auto editors. 4,047,813, Cl. 355-95.000.
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Sperber, Karl: *See*—
Williams, David Alan; Sperber, Karl; and Stoutz, Calvin Owen, 4,047,992, Cl. 156-73.100.
Spevack, Jerome S., to Deuterium Corporation. Method for enrichment by dual temperature exchange. 4,047,905, Cl. 55-37.000.
Spicuzza, John P., Jr.; and Sutej, Joseph M., to ARCO Polymers, Inc. Method for preparing improved expanded polystyrene sheet. 4,048,208, Cl. 264-45.300.
Spicuzza, John P., Jr., to ARCO Polymers, Inc. Method for preparing improved expanded polystyrene sheet. 4,048,272, Cl. 264-45.300.
Spiers, Steven F.; Lewis, Howard M.; Kraft, Gerald A.; and Pasquine, Arthur R., to Philip Morris Incorporated. Apparatus for calibrating cigarette inspection device. 4,047,421, Cl. 73-1.00R.
Spinner, Georg. Method of reshaping tubular conductor sheath. 4,047,291, Cl. 29-628.000.
Spooner, Archer Michael, to Redifon Limited. Visual display apparatus. 4,048,653, Cl. 358-104.000.
Sprague Electric Company: *See*—
Eysermans, Hubert, 4,048,670, Cl. 361-421.000.
Sprangers, Ann: *See*—
Thomaschefsky, Susan N.; and Sprangers, Ann, 4,047,534, Cl. 128-461.000.
Spry, Douglas O.: *See*—
Cooper, Robin D. G.; and Spry, Douglas O., 4,048,157, Cl. 260-239.00A.
Square D Company: *See*—
Lemke, Winfred R., 4,048,663, Cl. 361-75.000.
Staar, S.A.: *See*—
Staar, Theophiel Clement Jozef Lodewijk, 4,048,661, Cl. 360-130.000.
Staar, Theophiel Clement Jozef Lodewijk, to Staar, S.A. Device for guiding and winding magnetic tape in recording and/or reproducing apparatus. 4,048,661, Cl. 360-130.000.
Stach, Heinrich: *See*—
Haferkamp, Dirk; Hodzic, Alija; Paetz, Eike; and Stach, Heinrich, 4,047,742, Cl. 285-187.000.
Staebler, Paul J.: *See*—
Goloff, Alexander; Barker, Noble G.; and Staebler, Paul J., 4,047,855, Cl. 418-53.000.
Stafford, Warren Jess: *See*—
Gale, Preston Lee; and Stafford, Warren Jess, 4,048,464, Cl. 219-121.0LM.
Stahlecker, Fritz, to Stahlecker, Hans; and Stahlecker, Fritz. Spinning machine facility with a plurality of open end spinning machines and at least one servicing instrument. 4,047,371, Cl. 57-34.00R.
Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,047,371, Cl. 57-34.00R.
Stahlhut, Leo G.; and Garnett, Willard R., to Emerson Electric Co. Lighting system. 4,047,336, Cl. 52-28.000.
Stamicarbon B.V.: *See*—
Alfenaar, Marinus; and Van Gasse, Rene L. E., 4,048,386, Cl. 429-38.000.
van den Berg, Cornelis E.P.V.; and Vroomans, Hubertus J., 4,048,429, Cl. 528-497.000.
Standard Brands Incorporated: *See*—
Speakman, Edwin L., 4,048,434, Cl. 536-105.000.
Standard Oil Company: *See*—
Steigelmann, Edward F.; and Hughes, Robert D., 4,047,908, Cl. 55-158.000.
Standard Oil Company (Indiana): *See*—
Keske, Robert G.; Poppe, Wassily W.; and Fielding, Ivor R., 4,048,131, Cl. 260-33.20R.
Menzl, Roland L.; and Hopkins, P. Donald, 4,048,094, Cl. 252-414.000.
Petersen, Richard D.; and Mieville, Rodney L., 4,048,058, Cl. 208-138.000.
Stephens, James R., 4,048,144, Cl. 260-47.0CP.
Standun, Inc.: *See*—
Scholz, William A., 4,047,550, Cl. 150-52.00R.
Star Paper Limited: *See*—
Blakey, Rene C.; Riddell, Robert G.; Whittaker, John; and Wilson, John A., 4,048,380, Cl. 428-511.000.
Starkus, Charles J.: *See*—
Dale, C. Harold, Jr.; Howe, Spencer D.; Bonebreak, Robert L.; and Starkus, Charles J., 4,047,792, Cl. 350-6.000.
Starmer, Philip Hubert, to B. F. Goodrich Company, The. Vulcanizable compositions of a halogen-containing polymer and a diene-nitrile rubber having active halogen cure sites. 4,048,261, Cl. 260-888.000.
Starr, Michael T. Film retriever. 4,047,653, Cl. 226-92.000.
Stary, William Richard; and Shaw, David Merrill, to Caterpillar Tractor Co. Vehicle fire suppression access port. 4,047,572, Cl. 169-62.000.
Staub, Fred W.; and Jaster, Heinz, to General Electric Company. Vaporization cooled transformer. 4,048,603, Cl. 336-57.000.
Staub, Fred W.: *See*—
Jaster, Heinz; and Staub, Fred W., 4,047,561, Cl. 165-32.000.
Steel Company of Canada, Limited, The: *See*—
Hookings, Paul H.; Wade, Harry C.; and Deijs, Phillip, 4,047,419, Cl. 72-370.000.

Stegmeier, William J. Disposable mold form and method of molding. 4,048,270, Cl. 264-34.000.
Stehl, Otto: *See*—
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,047,351, Cl. 52-616.000.
Steigelmann, Edward F.; and Hughes, Robert D., to Standard Oil Company. Gas separation membrane. 4,047,908, Cl. 55-158.000.
Steinbatz, Alfred, to C. Reichert Optische Werke, AG. Filter regulator for microspectrophotometer. 4,047,818, Cl. 356-189.000.
Stepe, Visvaldis A., to Caterpillar Tractor Co. Corner tooth assembly. 4,047,312, Cl. 37-141.00R.
Stephens, James R., to Standard Oil Company (Indiana). Preparation of solid polymers from aromatic primary diamine and acyl halide of trimellitic anhydride. 4,048,144, Cl. 260-47.0CP.
Stephens, Leonard J.: *See*—
Bake, Earl A.; and Stephens, Leonard J., 4,047,275, Cl. 29-157.10R.
Stephens, Robert K., to Polaroid Corporation. Anti-reflection coatings for photographic bases. 4,047,804, Cl. 350-164.000.
Sterzel, Hans-Josef: *See*—
Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, 4,048,135, Cl. 260-40.00R.
Stevens, Peter, to Oxy Metal Industries Corporation. Electrodeposition of gold-palladium alloys. 4,048,023, Cl. 204-44.000.
Stevenson, Donald R., to SCM Corporation. Pigmentable low shrink thermosetting polyesters. 4,048,257, Cl. 260-862.000.
Stewart, Donald Fergusson: *See*—
Pollard, Leslie John; and Stewart, Donald Fergusson, 4,047,934, Cl. 75-29.000.
Stewart, John Kenneth; and von Beckmann, Helmuth, to Canron, Inc. Method of drilling and injecting perservative fluid into railway ties. 4,048,353, Cl. 427-291.000.
Stich, Frederick A., to Allis-Chalmers Corporation. Variable frequency, variable voltage power supply. 4,048,554, Cl. 363-98.000.
Stockum, Glenn Francis, to Arbrook, Inc. Glove and form and method for making same. 4,047,251, Cl. 2-168.000.
Stoeckelmann, Guenter: *See*—
Bruenemann, Hilmar; and Stoeckelmann, Guenter, 4,048,074, Cl. 210-323.00T.
Stoll, Alois; and Bergmeister, Eduard, to Wacker-Chemie GmbH. Water-dilutable tetrapolymers of vinyl acetate, maleic diesters, crotonic acid and hydrophilic unsaturated copolymerizable esters. 4,048,192, Cl. 260-33.40R.
Stoller Chemical Company, Inc.: *See*—
Stoller, Jerry H., 4,048,346, Cl. 426-583.000.
Stoller, Jerry H., to Stoller Chemical Company, Inc. Method of stabilizing lactose compositions. 4,048,346, Cl. 426-583.000.
Stone, Dale Eugene, to Bell Telephone Laboratories, Incorporated. Digitally regulated inverter. 4,048,552, Cl. 336-25.000.
Stotzel, Lothar; and Heider, Dieter. Stacking apparatus for ferrous sheets. 4,047,621, Cl. 214-6.0DS.
Stout, James T.; and Plaxico, Robert E., to Mead Corporation, The. Article carrier. 4,047,610, Cl. 206-187.000.
Stoutz, Calvin Owen: *See*—
Williams, David Alan; Sperber, Karl; and Stoutz, Calvin Owen, 4,047,992, Cl. 156-73.100.
Stoycheva, Dushka Staneva: *See*—
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
Streck, Roland: *See*—
Haag, Horst; Nordsiek, Karl-Heinz; Streck, Roland; and Zerpner, Dieter, 4,048,262, Cl. 260-889.000.
Stroezel, Manfred: *See*—
Beck, Fritz; Francke, Diethard; Nohe, Heinz; Hannebaum, Heinz; and Stroezel, Manfred, 4,048,047, Cl. 204-270.000.
Strudthoff, Stanley L.: *See*—
Roach, Maurice P.; and Strudthoff, Stanley L., 4,048,556, Cl. 324-40.000.
Stubbings, James Henry, to Potomac Applied Mechanics, Inc. Sheet metal cutting. 4,047,457, Cl. 83-71.000.
Studco, Inc.: *See*—
Knorr, William L., 4,047,355, Cl. 52-738.000.
Studiengesellschaft Kohle m.b.H.: *See*—
Wilke, Gunther; and Heimbach, Paul, 4,048,214, Cl. 560-128.000.
Stumbar, James P.; Carl, Daniel E.; and Lee, Suh Y., to Westinghouse Electric Corporation. Method for thermally de-sooting heat transfer surfaces. 4,047,972, Cl. 134-2.000.
Sudo, Michio. Method for manufacturing a flattened cylindrical film consisting of layers of thermoplastic resin stretched lengthwise and crosswise. 4,047,997, Cl. 156-229.000.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, to American Cyanamid Company. Control of corrosion and scale in circulating water systems by means of partial esters of polyfunctional organic acids. 4,048,065, Cl. 210-58.000.
Suggs, Charles W. Automatic leaf spreader for a tobacco harvester. 4,047,365, Cl. 56-27.500.
Sugihara, Kunihiko: *See*—
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,047,510, Cl. 123-119.00A.
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, to Takeda Chemical Industries, Ltd. d-α-Isobutylsulfobenzylpenicillin hemi-solvate crystals. 4,048,158, Cl. 260-239.100.
Sugimoto, Masahiro: *See*—
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Sugita, Yasunori; and Itagaki, Yasuhiko, to Mitsui Toatsu Chemicals, Incorporated. Article made of propylene-ethylene copolymer. 4,048,409, Cl. 526-5.000.
Suh, John T.: *See*—
Svoboda, Glenn R.; Suh, John T.; Carlstrom, William L.; and Maechtle, Gary L., 4,048,104, Cl. 260-2.5AN.
Sulzer Brothers Limited: *See*—
Bosshard, Ernst, 4,048,504, Cl. 250-434.000.
Sieber, Adolf, 4,048,509, Cl. 250-522.000.
Weber, Max, 4,047,506, Cl. 122-32.000.
Weber, Max, 4,047,562, Cl. 165-111.000.
Sumi, Yasuaki, to Sanyo Electric Co., Ltd.; and Tottori Sanyo Electric Co., Ltd. Multiple-band digital frequency synthesizer receiver. 4,048,570, Cl. 325-459.000.
Sumitomo Chemical Company, Limited: *See*—
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, 4,048,275, Cl. 264-54.000.
Yamamoto, Michihiro; Katayama, Shigenari; Koshiba, Masao; and Yamamoto, Hisao, 4,048,168, Cl. 260-251.0QB.
Sumiyama, Hiroshi: *See*—
Urakawa, Masaharu; and Sumiyama, Hiroshi, 4,048,014, Cl. 195-66.00B.
Sumiyoshi, Masaharu: *See*—
Noguchi, Masaaki; Sumiyoshi, Masaharu; and Hobo, Nobuhito, 4,047,507, Cl. 123-32.0Ea.
Sun Metal Products, Inc.: *See*—
Krenz, Joseph H., 4,047,745, Cl. 292-302.000.
Sun Oil Company of Pennsylvania: *See*—
Wagner, Walter D., 4,047,548, Cl. 141-52.000.
Sundberg, Erik, to Aktiebolaget Tudor. Battery electrode sheaths. 4,048,398, Cl. 429-140.000.
Sundberg, Jack Gunnar, to Chandler Evans Inc. Axial vane pump with non-rotating vanes. 4,047,859, Cl. 418-232.000.
Sunoo, Hyeng P. Fatigue relieving foot appliance. 4,047,310, Cl. 36-11.500.
Suntech, Inc.: *See*—
Seitzer, Walter H., 4,048,029, Cl. 204-129.000.
Superior Electric Company, The: *See*—
Kaufman, George A., Jr., 4,048,530, Cl. 310-89.000.
Suprunchuk, Tony: *See*—
Carlsson, David J.; Suprunchuk, Tony; and Wiles, David M., 4,048,367, Cl. 428-220.000.
Surber, William A.: *See*—
Harris, Samuel C., Jr.; and Surber, William A., 4,048,625, Cl. 364-900.000.
Sutej, Joseph M.: *See*—
Spicuzza, John P., Jr.; and Sutej, Joseph M., 4,048,208, Cl. 264-45.300.
Sutherland, James Gordon, to Alcan Aluminum Corporation. Composite beam structure. 4,047,354, Cl. 52-729.000.
Suzaka, Yukinori; and Saeda, Shigeru, to Showa Denko K.K. Antistatic organic liquid composition. 4,048,118, Cl. 252-518.000.
Suzuki, Nobuyuki: *See*—
Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, 4,048,307, Cl. 424-180.000.
Suzuki, Tadaaki: *See*—
Ishii, Atsushi; Oikawa, Kiyoshi; Suzuki, Tadaaki; Morita, Tetsuro; and Iizuka, Yoshio, 4,048,656, Cl. 358-261.
Suzuki, Toshiharu: *See*—
Nakagome, Keisuke; and Suzuki, Toshiharu, 4,048,005, Cl. 156-630.000.
Svensson, Nils David, to Aktiebolaget Iggesunds Bruk. Knife device for a chopper. 4,047,670, Cl. 241-92.000.
Svoboda, Glenn R.; Suh, John T.; Carlstrom, William L.; and Maechtle, Gary L., to Freeman Chemical Corporation. Polyisocyanate prepolymers from scrap polyester and polyurethane foam products obtained therefrom. 4,048,104, Cl. 260-2.5AN.
Sweeney, John L., Jr. Method and apparatus for repairing damaged materials particularly suited to repairing knit or polyester materials. 4,047,300, Cl. 30-358.000.
Sweet, Francis W.: *See*—
Sill, Arthur D.; and Sweet, Francis W., 4,048,230, Cl. 260-570.50C.
Sweet, Lavern E. Bridging clip for truss joists. 4,047,352, Cl. 52-693.000.
Swiecicki, Ignacy: *See*—
Mayo, Howard A., Jr.; and Swiecicki, Ignacy, 4,047,831, Cl. 415-1.000.
Swin, Richard E., Sr. Apparatus for molding dynamically balanced fans. 4,047,692, Cl. 249-142.000.
Swiss Aluminium Ltd.: *See*—
Maitland, Alexander, 4,047,600, Cl. 191-29.00R.
Syntex Corporation: *See*—
Fried, John H.; and Harrison, Ian T., 4,048,330, Cl. 424-308.000.
Szekely, Andrew Geza, to Union Carbide Corporation. Process for refining molten metal. 4,047,938, Cl. 75-67.00A.
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, to Chemokomplex Vegyipari Gep-es Berendezes Export-Import Vallalat; and Tatabanyai Szenbanyak. Process for the extraction of alumina from minerals, rocks and industrial by-products. 4,048,285, Cl. 423-132.000.
Szporny, Laszlo: *See*—
Karpati, Egon; Szporny, Laszlo; Bartok, Mihaly; Czombos, Jozsef; Felfoldi, Karoly; Laszlavik, Marta; and Notheisz, Ferenc, 4,048,322, Cl. 424-283.000.

Szymber, Oleg: *See—*
Culver, Irven H.; and Szymber, Oleg, 4,047,447, Cl. 74-409.000.

T-Bar Incorporated: *See—*
Seiden, Lewis J.; Landesberg, William; and Young, Gladstone F., 4,048,672, Cl. 364-200.000.

T. Y. Lin International: *See—*
Yang, Yue-Chyou, 4,047,389, Cl. 61-59.000.

Tadokoro, Yoshio: *See—*
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, 4,048,275, Cl. 264-54.000.

Tagirov, Kurban Magomedovich; and Akopian, Nikolai Rubenovich. Method of successively opening-out and treating productive formations. 4,047,569, Cl. 166-308.000.

Taiyo Kaken Company, Ltd.: *See—*
Murakami, Heiichiro; and Okamoto, Tsuneo, 4,047,906, Cl. 55-79.000.

Takagi, Kazumi, to Takagi Sangyo Kabushiki Kaisha. Perfect fuel gasification device for use in combination with a combustion apparatus of internal combustion engine. 4,047,511, Cl. 123-122.00G.

Takagi Sangyo Kabushiki Kaisha: *See—*
Takagi, Kazumi, 4,047,511, Cl. 123-122.00G.

Takagi, Yasuo: *See—*
Nakajima, Yasuo; Hayashi, Yoshimasa; Takagi, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,047,510, Cl. 123-119.00A.

Takahashi, Hidenori: *See—*
Maeda, Muneyoshi; Watanabe, Shigeo; Takahashi, Hidenori; and Sogi, Toshiyuki, 4,047,552, Cl. 152-361.00R.

Takahashi, Kihei; and Higuchi, Yositaka, to Yoshida Kogyo Kabushiki Kaisha. Separable slide fastener. 4,047,264, Cl. 24-205.11R.

Takahashi, Noriyuki; and Miura, Kimio, to Honda Giken Kogyo Kabushiki Kaisha. Correction device in a power steering apparatus for vehicles. 4,047,728, Cl. 180-141.000.

Takahata, Hitoshi: *See—*
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,124, Cl. 260-5.000.
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,424, Cl. 526-237.000.

Takai, Isao, to Oda Gosen Kogyo Kabushiki Kaisha. False-twisting method and apparatus for producing crimped filament yarns. 4,047,373, Cl. 57-77.400.

Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, to Teijin Limited. Method of purifying crude 2,6-naphthalenedicarboxylic acid dimethyl ester. 4,048,021, Cl. 203-91.000.

Takatsu, Haruyoshi: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.

Takeda Chemical Industries, Ltd.: *See—*
Sugimoto, Keiichi; Nishijima, Koji; Hanaoka, Tadashi; Akimoto, Hiroshi; and Kakeya, Nobuharu, 4,048,158, Cl. 260-239.100.

Takei, Haruo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ogawa, Akira, 4,047,964, Cl. 96-126.000.

Takeoshi, Tohru, to General Electric Company. Polyetherimides. 4,048,142, Cl. 260-47.0CP.

Takeuchi, Hideki: *See—*
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, 4,048,275, Cl. 264-54.000.

Takeuchi, Kazuaki, to Chuo Hatsujo Kogyo Co., Ltd. Pipe hanger. 4,047,683, Cl. 248-62.000.

Talcott, James M.: *See—*
Smith, Gordon A.; and Talcott, James M., 4,047,339, Cl. 52-108.000.

Tamura, Yukio; Hirosawa, Katsu; and Ogaki, Koji, to Kabushiki Kaisha Komatsu Seisakusho. Method of forming a subterranean water barrier and a plow for use therewith. 4,047,387, Cl. 61-13.000.

Tanabe, Shoji: *See—*
Shibanai, Ichiro; and Tanabe, Shoji, 4,048,359, Cl. 428-1.000.

Tanaka, Hiroshi; and Kato, Osamu, to NGK Spark Plug Co., Ltd. Sintered alloy for cutting tools. 4,047,897, Cl. 428-539.500.

Tanaka, Yoshinori; Shinoda, Hajime; and Narahara, Hisaaki, to Sony Corporation. Still color television signal recording and reproducing apparatus. 4,048,650, Cl. 358-1.000.

Taneda, Nobuo: *See—*
Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, 4,048,021, Cl. 203-91.000.

Tanno Senshoku Kogyo Co., Ltd.: *See—*
Hayashi, Takashi, 4,047,404, Cl. 68-152.000.

Tapp, David J.: *See—*
Schuessler, John C.; and Tapp, David J., 4,048,601, Cl. 335-193.000.

Tassi, Andras: *See—*
Toth, Laszlo; Schirhuber, Janos; Prepost, Kalman; and Tassi, Andras, 4,048,466, Cl. 219-121.0EM.

Tatabanyai Szenbanyak: *See—*
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.

Taus, Christian: *See—*
Rau, Willy; and Taus, Christian, 4,047,576, Cl. 172-540.000.

Tax, Hans; and Hosler, Klaus, to Tax, Hans. Luffing crane with overload protection mechanism. 4,047,617, Cl. 212-39.0MS.

Taylor, Allen L., to Minnesota Mining and Manufacturing Company. Kinetic sensor employing polymeric piezoelectric material. 4,048,526, Cl. 310-329.000.

Taylor, James E.: *See—*
Brummett, Marshall G.; Heckman, Russell W.; Nickey, George A.; and Taylor, James E., 4,048,281, Cl. 264-230.000.

Taylor, Lynn J.; and Tobias, John W., to Owens-Illinois, Inc. Environmentally degradable polymer compositions. 4,048,410, Cl. 526-22.000.

Taylor, Stanley, to EMI Limited. Radiography with noble gas containing detector cells. 4,048,503, Cl. 250-385.000.

Tazume, Masayuki: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.

TDK Electronics Co., Ltd.: *See—*
Nakagawa, Shiro, 4,048,658, Cl. 360-9.000.

Technica-Guss GmbH: *See—*
Krall, Heribert A.; and Maag, Helmut, 4,047,468, Cl. 90-11.00C.

Teco, Inc.: *See—*
Dammeyer, Bruce, 4,047,593, Cl. 182-2.000.

Teijin Limited: *See—*
Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, 4,048,021, Cl. 203-91.000.

Tejas Instrument Engineers, Inc.: *See—*
Caldwell, Bruce J., 4,048,640, Cl. 346-140.00A.

Telefonaktiebolaget L M Ericsson: *See—*
Carlsson, Rolf Christer, 4,048,579, Cl. 330-151.000.
Lyberg, Bertil, 4,048,581, Cl. 331-1.00A.

Telesonics, Inc.: *See—*
Wegner, Carl R., 4,048,654, Cl. 358-144.000.

Teletype Corporation: *See—*
Knuth, Kurt E., 4,048,657, Cl. 358-285.000.

Tension Envelope Corporation: *See—*
Klein, Bernard, 4,047,661, Cl. 229-70.000.

Terasaki, Syuuzi: *See—*
Yoshikawa, Shinsuke; Terasaki, Syuuzi; and Sasaki, Tohru, 4,047,998, Cl. 156-275.000.

Ternikova, Tamara Alexandrovna: *See—*
Kovin, Vladimir Mikhailovich; Mitenkov, Fedor Mikhailovich; Ovechkin, Alexandr Vasilievich; Pankratov, Vladimir Alexeevich; Savin, Nikolai Ivanovich; Ternikova, Tamara Alexandrovna; Filippov, Vladimir Jurievich; Khramov, Dmitry Alexandrovich; Chernomordik, Evgeny Naumovich; Shiryaev, Vladimir Ivanovich; Muzychuk, Vladimir Romanovich; and Savin, Alexandr Nikolaevich, 4,048,011, Cl. 176-40.000.

Terzaghi, Giovanni, to Mecondor S.p.A. Double wall multitube bags for enclosing the active material of positive plates in electric lead batteries. 4,048,399, Cl. 429-141.000.

Tesch, Gunter H., to Breveteam S.A. Ground covering material. 4,047,327, Cl. 47-9.000.

Teschner, Eckart: *See—*
Hesse, Wolfgang; Ritz, Jurgen; and Teschner, Eckart, 4,047,903, Cl. 51-298.00R.

Tessler, Martin M.: *See—*
Rutenberg, Morton W.; Jarowenko, Wadym; and Tessler, Martin M., 4,048,435, Cl. 536-106.000.

Tex-Trans, Inc.: *See—*
Ulrich, Bernhard, Jr., 4,047,765, Cl. 303-24.00F.

Texaco Inc.: *See—*
Allen, Joseph C., 4,048,078, Cl. 252-8.55D.
Bich, John R., 4,048,635, Cl. 340-347.0DA.
Canup, Robert E.; and McPeak, Earl W., Jr., 4,047,783, Cl. 339-97.00R.
Cole, Edward L.; Hess, Howard V.; and Wong, James, Jr., 4,047,898, Cl. 44-1.00G.
Dorn, Peter; and Foucher, Walter D., Jr., 4,047,900, Cl. 44-68.000.
Knifton, John F., 4,048,093, Cl. 252-414.000.
Lee, Gary D.; Vartanian, Paul F.; and Biasotti, Joseph B., 4,048,080, Cl. 252-51.540.
Powell, Justin Christopher, 4,047,899, Cl. 44-63.000.

Texas Instruments Incorporated: *See—*
Cochran, Michael J.; and Grant, Charles P., Jr., 4,048,624, Cl. 364-200.000.
Ward, Phillip W.; Donald, Robert C., Jr.; and Leerskov, Arthur E., Jr., 4,047,391, Cl. 181-119.000.

Textile Trim, Inc.: *See—*
Tietze, Kenneth V., 4,047,263, Cl. 16-125.000.

Th. Goldschmidt AG: *See—*
Greinacher, Ekkehard, 4,048,026, Cl. 204-61.000.

Th. Kieserling & Albrecht: *See—*
Lorenz, Horst; Koch, Rolf Eckart; and Kahlhofer, Reiner, 4,047,470, Cl. 90-15.00R.

Theidel, Hans: *See—*
Kackstadter, Klaus; and Theidel, Hans, 4,047,887, Cl. 8-1.00W.

Theissen, Ferdinand: *See—*
Koberstein, Edgar; Muller, Klaus; and Theissen, Ferdinand, 4,048,232, Cl. 260-601.00R.

Thermo Electron Corporation: *See—*
Clay, Warren C., 4,047,849, Cl. 417-384.000.

Thiokol Corporation: *See—*
McCullough, Edward E.; Greenwood, Stewart H.; Sherard, Hoyt, Jr.; McDonald, Richard D.; Hirschi, Ronald G.; and Randall, Alfred R., 4,047,667, Cl. 239-265.350.

Thomas, Janine M.: *See—*
Fauran, Claude P.; Raynaud, Guy M.; Turin, Michel J.; and Thomas, Janine M., 4,048,164, Cl. 544-121.000.

Thomaschefsky, Susan N.; and Sprangers, Ann, to Kimberly-Clark Corporation. Nursing pad. 4,047,534, Cl. 128-461.000.

Thomerson, Clarence T.: *See*—
Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., 4,047,391, Cl. 61-94.000.
Thompson, Francis T.; and Brennen, Michael B., to Westinghouse Electric Corporation. Flip-flop with false triggering prevention circuit. 4,048,521, Cl. 307-291.000.
Thomson-CSF: *See*—
Charransol, Pierre; Hauri, Jacques; and Danis, Roger, 4,048,482, Cl. 235-153.0AE.
Drabowitch, Serge, 4,048,592, Cl. 333-6.000.
Thorneburg Hosiery Mill, Inc.: *See*—
Thorneburg, James L., 4,047,400, Cl. 66-171.000.
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Thorud, Richard A., to Toro Company, The. Rotary mower bagging apparatus. 4,047,367, Cl. 56-202.000.
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Bernard, Jean; Frossati, Giorgio; Guernet, Georges; Montier, Michel; Peccoud nee Toupillier, Louise; and Thoulouze, Daniel, 4,047,436, Cl. 73-362.0SC.
Throckmorton, Morford C., to Goodyear Tire & Rubber Company, The. Method of polymerization of conjugated diolefins using iron catalysts and nitrogen ligands. 4,048,418, Cl. 526-138.000.
Thrower, Arthur J., to B. F. Goodrich Company, The. Caliper brake torque plate. 4,047,598, Cl. 188-71.100.
Thumm, Jeffrey R.: *See*—
Haselwood, Donald E.; Solar, Carl M.; and Thumm, Jeffrey R., 4,048,562, Cl. 325-31.000.
Thyberg, Bertil Sven Johan; and Elmgren, Karl Arne Stig, to AB Westin & Backlund. Clamping device for work pieces of irregular shape. 4,047,709, Cl. 269-22.000.
Tibbs, Robert C. Vascular contact rotating and stationary abrading electrode devices for electric weed killing. 4,047,326, Cl. 47-1.300.
Tibbs, Robert C., II. Discharge controlling plow sweep. 4,047,577, Cl. 172-730.000.
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Timmerman, Daniel Maurice: *See*—
De Winter, Walter Frans; and Timmerman, Daniel Maurice, 4,047,957, Cl. 96-67.000.
Tixier, Rene: *See*—
Boschetti, Egisto; Moroux, Yvette Paule Nicole; and Tixier, Rene, 4,048,377, Cl. 428-474.000.
Tjufilin, German Mikhailovich: *See*—
Borzyak, Jury Gordeevich; Borisenko, Alexandr Ivanovich; Tjufilin, German Mikhailovich; Rolik, Alexandr Ivanovich; and Yakovlev, Alexandr Ivanovich, 4,048,280, Cl. 264-102.000.
Toa Paint Co. Ltd.: *See*—
Sakayori, Seigo; Kuro, Tomoyosi; Morita, Kazuyuki; Hinooka, Nobuya; Niimi, Hirozi; and Komatsu, Kensuke, 4,048,355, Cl. 427-375.000.
Tobias, John W.: *See*—
Taylor, Lynn J.; and Tobias, John W., 4,048,410, Cl. 526-22.000.
Tobin, Melvin W.: *See*—
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Jursa, Stephen J. D., 4,047,916, Cl. 65-106.000.
Todisco, Joseph G.: *See*—
Di Maio, Anthony E.; and Todisco, Joseph G., 4,047,281, Cl. 29-429.000.
Tokura, Yukio: *See*—
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Arita, Isao, 4,048,643, Cl. 354-51.000.
Miura, Hiroshi, 4,048,542, Cl. 315-39.710.
Sano, Shunichi, 4,048,633, Cl. 340-324.00M.
Tolaas, William M., to Hoerner Waldorf Corporation. Recloseable carton. 4,048,052, Cl. 206-625.000.
Toledo, Emil: *See*—
Bennett, Charles; and Toledo, Emil, 4,048,048, Cl. 204-279.000.
Tom McGuane Industries, Inc.: *See*—
Ludwig, George, 4,047,696, Cl. 251-308.000.
Tomlinson, Kenneth; and Duff, Edward John, to Colgate-Palmolive Company. Dental preparation containing materials having calcium and phosphate components. 4,048,300, Cl. 424-52.000.
Tomy Kogyo Co., Inc.: *See*—
Yamazaki, Tomio, 4,047,325, Cl. 46-106.000.
Tong, Shih Yung: *See*—
Peck, Richard John; and Tong, Shih Yung, 4,048,440, Cl. 178-69.100.
Toppan Printing Co., Ltd.: *See*—
Kudo, Kazuo; and Mizutani, Takashi, 4,047,868, Cl. 425-133.100.
Toro Company, The: *See*—
Thorud, Richard A., 4,047,367, Cl. 56-202.000.
Totani, Kazuo: *See*—
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 4,047,803, Cl. 350-160.0LC.
Toth, Laszlo; Schirhuber, Janos; Prepost, Kalman; and Tassi, Andras, to Magyar Vagon- es Gepgyar. Method of manufacturing axle housings with hollow axles. 4,048,466, Cl. 219-121.0EM.
Tottori Sanyo Electric Co., Ltd.: *See*—
Sumi, Yasuaki, 4,048,570, Cl. 325-459.000.
Toulios, Peter P.: *See*—
Knox, Robert M.; and Toulios, Peter P., 4,048,589, Cl. 331-107.00R.
Towmotor Corporation: *See*—
Koscinski, Daniel P., 4,047,759, Cl. 297-346.000.
Samide, Frank Richard, 4,047,750, Cl. 296-107.000.
Toyo Kogyo Co., Ltd.: *See*—
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, 4,047,514, Cl. 125-40.000.
Toyoda-Koki Kabushiki-Kaisha: *See*—
Yomogida, Toshihiko, 4,048,622, Cl. 364-900.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Ito, Hajime; Yamanaka, Teruo; and Ozeki, Osamu, 4,048,613, Cl. 340-53.000.
Noguchi, Masaaki; Sumiyoshi, Masaharu; and Hobo, Nobuhito, 4,047,507, Cl. 123-32.0Ea.
Tragesser, Charles W., to Westinghouse Electric Corporation. Circuit-interrupter grid structure for an oil-break circuit interrupter. 4,048,457, Cl. 200-150.00R.
Trank, Robert D., to Hollingsworth Solderless Terminal Company. Tap splice connector. 4,047,784, Cl. 339-98.000.
Trans-Sonics, Incorporated: *See*—
Westcott, Vernon C., 4,047,814, Cl. 356-38.000.
Transitron Electronic Corporation: *See*—
Bohn, Richard, 4,048,649, Cl. 357-43.000.
Tresper, Erhard; Neuray, Dieter; and Freitag, Dieter, to Bayer Aktiengesellschaft. 1,1,2-Tris-(o/p-hydroxyphenyl)-1-phenyl-ethanes. 4,048,200, Cl. 260-395.000.
Triad Fastner Corporation: *See*—
Damratowski, Harold E., 4,047,611, Cl. 206-347.000.
Tribotech: *See*—
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,047,768, Cl. 308-72.000.
Troccaz, Roger: *See*—
Druge, Gerard; and Troccaz, Roger, 4,047,414, Cl. 72-91.000.
Trombly, Edgar F., to Dart Industries Inc. Ice container. 4,047,633, Cl. 220-9.00R.
Tronvold, Harlan C., to Paper, Calmenson & Co. Torch cutting system with automated work support mechanism. 4,047,706, Cl. 266-49.000.
Trostmann, Erik; and Albertsen, Ove, to Dansk Styreteknik A/S. Apparatus for the production of rolled food products. 4,047,478, Cl. 99-450.100.
Trottier, Robert R.: *See*—
Kolm, Eric A.; and Trottier, Robert R., 4,048,596, Cl. 334-8.000.
Troue, Harden Henry, to Union Carbide Corporation. Apparatus for delivering relatively cold UV to a substrate. 4,048,490, Cl. 240-41.35D.
TRW Inc.: *See*—
Brooks, Edward F., 4,047,437, Cl. 73-421.50A.
Quigley, James R., 4,047,294, Cl. 29-749.000.
Witte, Arvel B.; Broadwell, James E.; and Hook, Dale L., 4,048,586, Cl. 331-94.50D.
Tsai, Yih-Wan, to PPG Industries, Inc. Regenerator flow control. 4,047,560, Cl. 165-9.300.
Tsubaki, Hidemi: *See*—
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,124, Cl. 260-5.000.
Ishikawa, Atsuo; Tsubaki, Hidemi; Takahata, Hitoshi; Iwata, Riso; and Shinohara, Yonesaku, 4,048,424, Cl. 526-237.000.
Tsuchiya, Shozo; Hayashi, Hideo; and Oshima, Akio, to Nippon Oil Company Ltd. Printing ink composition. 4,048,132, Cl. 260-33.6UA.
Tsujimoto, Kazumi N.: *See*—
Hill, Russell J.; and Tsujimoto, Kazumi N., 4,048,462, Cl. 219-121.0EB.
Tucker, Huel C.: *See*—
David, Donald J.; and Tucker, Huel C., 4,048,041, Cl. 204-195.00R.
Turin, Michel J.: *See*—
Fauran, Claude P.; Raynaud, Guy M.; Turin, Michel J.; and Thomas, Janine M., 4,048,164, Cl. 544-121.000.
Turner, Kathleen Harding. Vertically adjustable support. 4,047,687, Cl. 248-318.000.
UBE Industries, Ltd.: *See*—
Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, 4,048,197, Cl. 260-346.300.
Nagai, Shigeki; Iwata, Fumio; and Kubo, Kenzi, 4,048,236, Cl. 260-613.00D.
Uchida Sharyo Co., Ltd.: *See*—
Uchida, Suekichi, 4,047,753, Cl. 297-32.000.
Uchida, Suekichi, to Uchida Sharyo Co., Ltd. Foldable chair with rocking means. 4,047,753, Cl. 297-32.000.
Uchiyama, Seiji: *See*—
Yoshinaka, Shigeo; Uchiyama, Seiji; and Doya, Masaharu, 4,048,033, Cl. 204-158.0HA.
Ueda, Naoji: *See*—
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, 4,047,514, Cl. 125-40.000.
Uesugi, Kyozo: *See*—
Okano, Yukio; Kita, Nobuyuki; and Uesugi, Kyozo, 4,047,807, Cl. 350-266.000.
Uffner, Melville W., to Air Products and Chemicals, Inc. Cobaltic accelerators with group II metal oxides and hydroxides. 4,048,086, Cl. 252-182.000.
Ulmer, Richard Walter, to Motorola, Inc. Input protection circuit for CMOS oscillator. 4,048,584, Cl. 331-62.000.
Ulmschneider, Dieter: *See*—
Engelhardt, Friedrich; Hille, Martin; and Ulmschneider, Dieter, 4,048,077, Cl. 252-8.50C.

Ulrich, Bernhard, Jr., to Tex-Trans, Inc. Hydraulic power transmission and braking system for vehicles. 4,047,765, Cl. 303-24.00F.
Unger, Manfred: *See—*
Bergmann, Rolf; Hoheisel, Klaus; Schafer, Helmut; and Unger, Manfred, 4,048,150, Cl. 260-75.00T.
Union Carbide Corporation: *See—*
Bubnick, Gerald Frank; and Urry, Lewis Frederick, 4,048,389, Cl. 429-101.000.
Kronenberg, Marvin Lee, 4,048,402, Cl. 429-194.000.
Kronenberg, Marvin Lee, 4,048,403, Cl. 429-194.000.
Madden, Thomas Harry; and Reash, Clair Wilbur, 4,048,545, Cl. 316-2.000.
Manz, August Frederick, 4,048,465, Cl. 219-121.00R.
Senderoff, Seymour, 4,048,027, Cl. 204-61.000.
Szekely, Andrew Geza, 4,047,938, Cl. 75-67.00A.
Troue, Harden Henry, 4,048,490, Cl. 240-41.35D.
United Kingdom Atomic Energy Authority: *See—*
Keats, Albert Brian, 4,048,483, Cl. 235-153.00A.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Shanks, Ian Alexander, 4,048,358, Cl. 428-1.000.
United States of America
Army: *See—*
Berman, Allen, 4,047,466, Cl. 89-14.00R.
Campbell, Richard A.; Sparks, Richard A.; and Perry, Robert W., 4,048,580, Cl. 331-1.00R.
Cole, Lewis C., 4,047,484, Cl. 102-76.00P.
Cox, John T.; Garber, Michael B.; Jasper, Marilyn A.; and LoVecchio, Paul, 4,048,535, Cl. 313-367.000.
David, Donald J.; and Tucker, Huel C., 4,048,041, Cl. 204-195.00R.
Epstein, Joseph; and Berkowitz, Lewis M., 4,048,022, Cl. 204-1.00T.
Frost, Robert F., 4,048,513, Cl. 307-28.000.
LeFebvre, Clarence A.; and Cabezut, Joseph M., Jr., 4,047,382, Cl. 60-252.000.
Miller, Walter E., Jr.; Duke, Jimmy R.; and Sitton, Robert L., 4,047,678, Cl. 244-3.160.
Pell, Kynric M.; and Brown, David B., 4,047,816, Cl. 356-152.000.
Rast, Gustaf J., Jr.; Barley, Thomas A.; Hammond, Raiford L.; and Ashley, James R., 4,048,568, Cl. 325-363.000.
Williams, Nathan P., 4,047,483, Cl. 102-70.20A.
Wohlford, William P., 4,047,465, Cl. 89-8.000.
Energy Research and Development Administration: *See—*
Packer, Lester; and Bymun, Edwin N., 4,048,325, Cl. 424-298.000.
Vander Arend, Peter C.; and Fowler, William B., 4,048,437, Cl. 174-15.00S.
Health, Education and Welfare: *See—*
Otto, Lucy A., 4,048,016, Cl. 195-100.000.
National Aeronautics and Space Administration: *See—*
Ravenhall, Richard; Salemme, Charles T.; and Adamson, Arthur P., 4,047,840, Cl. 416-135.000.
Navy: *See—*
Adolph, Horst G., 4,048,219, Cl. 560-156.000.
Bennett, Charles; and Toledo, Emil, 4,048,048, Cl. 204-279.000.
Bishop, Walton B., 4,048,636, Cl. 343-6.5LC.
Falterman, Charles W.; and Sbrocca, Dino A., 4,047,990, Cl. 149-19.200.
Heffernan, Robert J., 4,047,380, Cl. 60-39.46R.
Hughes, Richard Swart; and Wilcox, Howard A., 4,047,795, Cl. 350-96.00C.
Moore, Kenneth L., 4,048,500, Cl. 250-350.000.
Osborne, Eugene F., 4,048,563, Cl. 325-58.000.
Sieber, Charles W.; Knutson, Richard K.; and Johnston, John W., 4,047,592, Cl. 181-142.000.
Weill, Paul B.; and Darby, Paul L., 4,047,988, Cl. 149-74.000.
U.S. Philips Corporation: *See—*
Boter, Pieter Abraham, 4,048,407, Cl. 429-217.000.
Severijns, Adrianus Petrus; and Aarts, Franciscus Henricus Eduard, 4,047,394, Cl. 62-502.000.
United States Steel Corporation: *See—*
Barnhart, Thomas F., 4,047,935, Cl. 75-34.000.
Grange, Raymond A.; and Miller, Robert L., 4,047,979, Cl. 148-12.00R.
Kolb, William A.; and Vignovich, Pete, 4,047,937, Cl. 75-59.000.
Lee, Edward J.; and Vavra, Frank, 4,047,708, Cl. 266-243.000.
Pignocco, Arthur J.; and Kachik, Robert H., 4,048,352, Cl. 427-234.000.
Vucic, Drago M., 4,047,659, Cl. 228-119.000.
United Technologies Corporation: *See—*
Ferris, Donald L.; and Faiz, Robert L., 4,047,838, Cl. 416-115.000.
Ferris, Donald Leroy; and Noehren, William Lawrence, 4,047,839, Cl. 416-134.00A.
Universal Manufacturing Corporation: *See—*
Miller, Imrich M., 4,048,606, Cl. 336-198.000.
University of California, The Regents of the: *See—*
Lee, Kwan-Hua, 4,048,204, Cl. 260-413.000.
University of Michigan, The Regents of the: *See—*
Counsell, Raymond E.; and Yu, Terry Ta-Jen, 4,048,297, Cl. 424-1.000.
Lucchesi, Benedict R., 4,048,335, Cl. 424-329.000.
Unmuth, George E., to Petrolite Corporation. Laminating compositions and uses. 4,048,376, Cl. 428-461.000.
UOP Inc.: *See—*
Antos, George J., 4,048,246, Cl. 260-668.00D.
Antos, George J., 4,048,249, Cl. 260-673.500.
Asselin, George F., 4,048,062, Cl. 208-321.000.
Douglas, Walter M., 4,048,097, Cl. 252-431.00N.
Grendahl, Bernard Elden, 4,047,689, Cl. 248-503.100.
Hayes, John C., 4,048,099, Cl. 252-441.000.
Hayes, John C., 4,048,244, Cl. 260-668.00D.
Martan, Michael, 4,048,034, Cl. 204-159.230.
Neuzil, Richard W.; and deRosset, Armand J., 4,048,205, Cl. 260-428.000.
O'Hara, Mark J., 4,048,115, Cl. 252-465.000.
Pollitzer, Ernest L.; and Hayes, John C., 4,048,245, Cl. 260-668.00D.
Rosback, Donald H.; and Neuzil, Richard W., 4,048,111, Cl. 252-455.00Z.
Ryu, Ji-Yong, 4,048,108, Cl. 252-442.000.
Ryu, Ji-Yong, 4,048,109, Cl. 252-442.000.
Ryu, Ji-Yong, 4,048,247, Cl. 260-671.00P.
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Shoffner, James P., 4,048,228, Cl. 260-566.00R.
Urban, Peter, 4,047,895, Cl. 23-288.00F.
Updegrave, William J. Versatile intraoral radiographic film positioning system. 4,048,506, Cl. 250-479.000.
Upjohn Company, The: *See—*
Kelly, Robert C., 4,048,193, Cl. 260-343.30R.
Nelson, Norman A., 4,048,194, Cl. 260-343.600.
Sekhar, Neel C., 4,048,331, Cl. 424-317.000.
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Urrea, Petronio D.: *See—*
Sibley, Murray J.; Yung, Gordon H. K.; and Urrea, Petronio D., 4,048,122, Cl. 252-541.000.
Urry, Lewis Frederick: *See—*
Bubnick, Gerald Frank; and Urry, Lewis Frederick, 4,048,389, Cl. 429-101.000.
Usami, Toshimasa: *See—*
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, 4,047,958, Cl. 96-87.00R.
Usamoto, Teruyoshi; Miyawaki, Kenji; Shiota, Toshiaki; Takeuchi, Hideki; and Tadokoro, Yoshio, to Sumitomo Chemical Company, Limited. Cross-linking and foaming injection molding process for ethylenic polymers. 4,048,275, Cl. 264-54.000.
Ushio, Masatoshi: *See—*
Murakami, Yasuo; Ushio, Masatoshi; and Matono, Hirokuni, 4,047,364, Cl. 53-389.000.
Vahlensick, Hans-Joachim: *See—*
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensick, Hans-Joachim, 4,048,374, Cl. 428-457.000.
Valanti, Pentti Antero. Method and apparatus for purifying emulsions and contaminated water with electolysis. 4,048,031, Cl. 204-149.000.
Vale, Christopher R., to Westinghouse Electric Corporation. Information extraction for Doppler radar. 4,048,595, Cl. 333-72.000.
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Vanacek, Josef: *See—*
Sandera, Josef; Calabek, Milan; Cenek, Miroslav; Kalab, Frantisek; Koudelka, Vojtech; Kouril, Oldrich; Malik, Jiri; and Vanacek, Josef, 4,048,406, Cl. 429-209.000.
Van Assche, Daniel, to Sandoz Ltd. Azo dyes having an optionally substituted 1-azo-3-nitro-4-arylaminophenyl nucleus. 4,048,153, Cl. 260-193.000.
VanAuken, Richard L., to Exxon Research and Engineering Company. Bicycle frame. 4,047,731, Cl. 280-281.00B.
Van Daelen, Henri-Jean G. M.: *See—*
Hendriks, Adrianus A. M.; and Van Daelen, Henri-Jean G. M., 4,048,538, Cl. 313-519.000.
van den Berg, Cornelis E.P.V.; and Vroomans, Hubertus J., to Stamicarbon B.V. Process for the preparation of polymer fibers. 4,048,429, Cl. 528-497.000.
Vander Arend, Peter C.; and Fowler, William B., to United States of America, Energy Research and Development Administration. Superconducting magnet cooling system. 4,048,437, Cl. 174-15.00S.
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Vanderveen, John W., to Phillips Petroleum Company. Carbon black pellet treatment. 4,047,896, Cl. 23-314.000.
Van Gasse, Rene L. E.: *See—*
Alfenaar, Marinus; and Van Gasse, Rene L. E., 4,048,386, Cl. 429-38.000.
Van Gossum, Lucien Janbaptist: *See—*
Van Paesschen, August Jean; and Van Gossum, Lucien Janbaptist, 4,048,357, Cl. 427-387.000.
Van Neste, Walter, to S.A. Texaco Belgium N.V. Slow release composition comprising slack wax-urea adduct. 4,047,922, Cl. 71-28.000.
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van Staveren, Hendricus Cornelis: *See—*
Oosterling, Pieter Adriaan; and van Staveren, Hendricus Cornelis, 4,047,369, Cl. 56-295.000.
Varian Techtron Proprietary Limited: *See—*
Bartlett, Ivan Robert, 4,047,808, Cl. 350-271.000.
Varta Batterie Aktiengesellschaft: *See—*
Sauer, Hans; and Czerny, Thomas, 4,048,472, Cl. 219-388.000.
Vartanian, Paul F.: *See—*
Lee, Gary D.; Vartanian, Paul F.; and Biasotti, Joseph B., 4,048,080, Cl. 252-51.540.
Vassilev, Georgi Nikolov: *See—*
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
Vassileva, Ragka Taneva: *See—*
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
Vassiliou, Eustathios, to Du Pont de Nemours, E. I., and Company. Longitudinally flexible squeegee and mounting strips therefor. 4,047,480, Cl. 101-123.000.
Vater, Wulf: *See—*
Bossert, Friedrich; and Vater, Wulf, 4,048,171, Cl. 260-256.40C.
Vaughn, Kennith E.; and Piper, Hugh V., to Caterpillar Tractor Co. Bushing removal adapter. 4,047,771, Cl. 308-237.00R.
Vavra, Frank: *See—*
Lee, Edward J.; and Vavra, Frank, 4,047,708, Cl. 266-243.000.
Vavrik, Ernest: *See—*
Skrabak, Michal; Vavrik, Ernest; Kolarik, Stanislav; and Mazak, Milos, 4,048,008, Cl. 162-104.000.
Vectrol, Inc.: *See—*
Muskovac, Nicholas G.; and Formhals, Bruce I., 4,048,520, Cl. 307-252.00Q.
Velichkova, Emilia Hristova: *See—*
Galabov, Angel Simeonov; Shindarov, Lubomir Mihaylov; Vassilev, Georgi Nikolov; Vassileva, Ragka Taneva; Dimcheva, Zlatka Petkova; Stoycheva, Dushka Staneva; and Velichkova, Emilia Hristova, 4,048,333, Cl. 424-322.000.
Veltel, Reinhardt: *See—*
Horstmann, Aloys; and Veltel, Reinhardt, 4,047,372, Cl. 57-34.00R.
Vely, Victor G.: *See—*
Litchfield, John H.; and Vely, Victor G., 4,048,299, Cl. 424-49.000.
Venis, Michael A. J.: *See—*
Bond, Richard P. M.; Pryce, Robert J.; Raven, Clive A.; and Venis, Michael A. J., 4,047,928, Cl. 71-88.000.
Venot, Jean, to ASA S.A. False twist texturizing spindle. 4,047,374, Cl. 57-77.450.
Vercesi, Gian Piero: *See—*
Molteni, Luigi; Vercesi, Gian Piero; and Antonini, Eraldo, 4,048,305, Cl. 424-177.000.
Vereinigte Edelstahlwerke AG. (VEW): *See—*
Lamarque, Gabriel, 4,047,555, Cl. 164-52.000.
Verger, Bernard: *See—*
Chillier-Duchatel, Nicole; and Verger, Bernard, 4,048,384, Cl. 429-22.000.
Vernieres, Jean-Claude: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, 4,048,334, Cl. 424-325.000.
Vernois, Michel: *See—*
Francois, Bernard; Vernois, Michel; and Franta, Emile, 4,048,420, Cl. 526-173.000.
Ver Strate, Gary: *See—*
Baldwin, Francis P.; Rae, James A.; and Ver Strate, Gary, 4,048,258, Cl. 260-879.000.
Vesque, Daniel: *See—*
Bernard, Jean-Michel; Labboz, Lucien; and Vesque, Daniel, 4,048,450, Cl. 179-18.0EB.
Vianova-Kunstharz, A.G.: *See—*
Behmel, Klaus, 4,048,252, Cl. 260-850.000.
Vibro/Dynamics Corporation: *See—*
Young, Sheldon E., 4,047,427, Cl. 73-141.00A.
Vice, William E.: *See—*
Forman, Aubry S., Jr.; Schultz, Charles A., Jr.; and Vice, William E., 4,048,619, Cl. 340-154.000.
Vick, Ralph L.: *See—*
Orme, Myrl E.; and Vick, Ralph L., 4,047,540, Cl. 137-239.000.
Vigini, Giorgio: *See—*
Lia, Bruno; and Vigini, Giorgio, 4,048,665, Cl. 361-152.000.
Vigneri, Alfonso, to Richard Rath Packaging Machinery, Inc. Packaging apparatus. 4,047,363, Cl. 53-371.000.
Vignovich, Pete: *See—*
Kolb, William A.; and Vignovich, Pete, 4,047,937, Cl. 75-59.000.
Vinal, Albert Watson, to International Business Machines Corporation. High carrier velocity FET magnetic sensor. 4,048,648, Cl. 357-27.000.
Vinals, Joaquin: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,048,201, Cl. 260-410.000.
Vincent, Michel; Remond, Georges; Pascaud, Xavier; and Poignant, Jean-Claude, to Science Union et Cie. Benzene sulphonamides processes for producing the same and pharmaceutical compositions incorporating them. 4,048,313, Cl. 424-248.500.
VMEI "LENIN" — NIS Research Institution: *See—*
Nenov, Dimiter Panayotov; and Danova, Verginia Ilieva, 4,048,025, Cl. 204-56.00R.
Vock, Manfred Hugo: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,048,201, Cl. 260-410.000.
Vockenhuber, Karl: *See—*
Pammer, Gottfried; and Kvasnicka, Rudolf, 4,047,442, Cl. 74-194.000.
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, to BASF Aktiengesellschaft. Catalyst for the hydrogenation of acetylene alcohols. 4,048,116, Cl. 252-470.000.
Voigt, Hermann Uwe, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Preparing thermo-plastic or elastomeric materials for cross-linking of grafted silane. 4,048,129, Cl. 260-23.00H.
Volker, Theodor: *See—*
Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.
Volkov, Vladimir Vladimirovich; Bagryantsev, Gennady Ivanovich; Larionov, Igor Grigorievich; Neermolov, Alexandr Filippovich; and Leontievsky, Valery Georgievich. Apparatus for disintegration of materials. 4,047,672, Cl. 241-175.000.
Von Bargen, John D.; and Siddiqui, Khalid U., to Source Gas Analyzers, Inc. Electrically driven high voltage ozonator. 4,048,668, Cl. 361-235.000.
von Beckmann, Helmuth: *See—*
Stewart, John Kenneth; and von Beckmann, Helmuth, 4,048,353, Cl. 427-291.000.
Von Borcke, Bernd: *See—*
Zeidler, Johannes; and Von Borcke, Bernd, 4,047,843, Cl. 416-185.000.
von der Eltz, Hans-Ulrich, to Hoechst Aktiengesellschaft. Apparatus for the continuous wet treatment of textiles in rope form. 4,047,403, Cl. 68-5.00E.
Vonlanthen, Christian: *See—*
Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.
Voorheis, Temple S.; and White, James H., to Coen Company, Inc. Integrated process for preparing and firing bagasse and the like for steam power generation. 4,047,489, Cl. 110-15.000.
Voronkov, Mikhail Grigorievich; and Dyakov, Valery Mikhailovich. Process for the production of 1-organylsilatranes and carbofunctional derivatives thereof. 4,048,206, Cl. 260-448.80R.
Vroomans, Hubertus J.: *See—*
van den Berg, Cornelis E.P.V.; and Vroomans, Hubertus J., 4,048,429, Cl. 528-497.000.
Vseojuzny Nauchno-Issledovatelsky Institut Plenochnykh Materialov I Iskusstvennoi Kozhi: *See—*
Dinzburg, Boris Nisonovich; Smetkin, Jury Alexandrovich; Alexeenko, Vladimir Iosifovich; Mikhailov, Vsevolod Andreevich; Lorant, Ivan; Seltenreich, Gyozo; Keszei, Jeno; Marton, Gyorgy; Balazsfai, Albert; Donath, Jeno; and Bolcskei, Erno, 4,047,860, Cl. 425-4.00R.
Vucic, Drago M., to United States Steel Corporation. Method for replacing worn tubes in a gas hood. 4,047,659, Cl. 228-119.000.
Vysoka skola chemicko technologicka: *See—*
Kralicek, Jaroslav; Kubanek, Vladimir; Kondelikova, Jaroslava; Casensky, Bohuslav; and Machacek, Jiri, 4,048,421, Cl. 526-177.000.
W. R. Grace & Co.: *See—*
Baird, William G., Jr.; Holbrook, Stanley E.; and Platt, Jeremy A., 4,048,428, Cl. 526-343.000.
Morgan, Charles R.; and Kramm, David E., 4,048,218, Cl. 560-147.000.
W. Schlafhorst & Co.: *See—*
Kamp, Heinz, 4,047,674, Cl. 242-18.0DD.
Wacker-Chemie GmbH: *See—*
Stoll, Alois; and Bergmeister, Eduard, 4,048,192, Cl. 260-33.40R.
Wada, Kaname: *See—*
Obinata, Tatsuichi; Wada, Kaname; Ogibayashi, Shigeaki; and Mihara, Hironobu, 4,047,556, Cl. 164-57.000.
Wada, Shigeru: *See—*
Matsuzawa, Norio; Oi, Hidesaburo; Nishimura, Hiroshi; Wada, Shigeru; and Sasaki, Juntaro, 4,048,415, Cl. 526-119.000.
Wada, Yoneji: *See—*
Yamada, Yoshio; and Wada, Yoneji, 4,048,071, Cl. 210-90.000.
Wadden, Dhafir Yusuf, to Imperial Chemical Industries Limited. Process for the manufacture of dicyanobutene. 4,048,216, Cl. 260-465.300.
Wade, Harry C.: *See—*
Hookings, Paul H.; Wade, Harry C.; and Deijs, Phillip, 4,047,419, Cl. 72-370.000.
Wagner, Fritz; and Sahm, Hermann, to Gesellschaft fur Molekularbiologische Forschung mbH. Process for producing single-cell protein from methanol using methylomonas sp. DSM 580. 4,048,013, Cl. 195-49.000.
Wagner, Robert L., to Allis-Chalmers Corporation. Foldup implement with lift arrangement for wing thereof. 4,047,575, Cl. 172-311.000.
Wagner, Walter D., to Sun Oil Company of Pennsylvania. Vapor recovery system with safety valve. 4,047,548, Cl. 141-52.000.
Wakigara, Toshikazu: *See—*
Morishita, Tsuyoshi; Miyake, Kenji; Ishii, Noboru; Wakigara, Toshikazu; and Ueda, Naoji, 4,047,514, Cl. 125-40.000.

Walbro Corporation: *See—*
O'Connor, Alton J.; and Schrinel, Thomas L., 4,047,852, Cl. 417-415.000.

Waldrop, Tom C.: *See—*
Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., 4,047,391, Cl. 61-94.000.

Walker, James Donald; and Kline, Leslie F., to Chicago Bridge & Iron Company. Aeration system with foldable low-loss downcomers and method of operation thereof. 4,048,267, Cl. 261-122.000.

Walker, Loren H.; and Kornrumpf, William P., to General Electric Company. Apparatus for starting high pressure gaseous discharge lamps. 4,048,539, Cl. 315-176.000.

Walsh, James Calvin; Wilson, Joseph Townsend, III; and Wolfe, Bruce Allen, to International Business Machines Corporation. Ink jet nozzle with tilted arrangement. 4,048,639, Cl. 346-75.000.

Walsh, Thomas P.: *See—*
Hubbard, Howard H.; and Walsh, Thomas P., 4,047,287, Cl. 29-600.000.

Walsh, Walter Michael, Jr.: *See—*
Rupp, Louis William, Jr.; and Walsh, Walter Michael, Jr., 4,048,555, Cl. 324-.5MA.

Ward, Arthur Gerard: *See—*
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,047,991, Cl. 156-62.600.

Ward, John Joseph Bernard: *See—*
Patel, Direj Vallabhbhai; and Ward, John Joseph Bernard, 4,048,024, Cl. 204-55.00R.

Ward, Phillip W.; Donald, Robert C., Jr.; and Leerskov, Arthur E., Jr., to Texas Instruments Incorporated. Air gun monitoring and synchronizing method and apparatus. 4,047,591, Cl. 181-119.000.

Ward Products Corporation: *See—*
Cejka, Joseph B., 4,048,638, Cl. 343-894.000.

Wardell, Martin Bernard Peter: *See—*
Courtenay, John Henry; and Wardell, Martin Bernard Peter, 4,048,134, Cl. 260-38.000.

Warneke, Sehon Lester: *See—*
Quock, Billy; Kelley, Don Howard; and Warneke, Sehon Lester, 4,048,102, Cl. 260-2.5AM.

Wassermann, Martin; and Meyer, Arnold, to Condea Chemie GmbH. Process for making extrudates from aluminum oxyhydrates. 4,048,295, Cl. 423-626.000.

Watanabe, Shigeo: *See—*
Maeda, Muneyoshi; Watanabe, Shigeo; Takahashi, Hidenori; and Sogi, Toshiyuki, 4,047,552, Cl. 152-361.00R.

Watanabe, Tsuguhiko. Automatic output control method and dynamo equipment for generating sets using automobile wheel friction drive. 4,048,511, Cl. 290-1.00R.

Watercutter, Steven N.: *See—*
Gasser, Rupert Josef; and Watercutter, Steven N., 4,048,344, Cl. 426-385.000.

Waters, Percy Lloyd, to Commonwealth Scientific and Industrial Research Organization. Thermal treatment of materials by hot particulates. 4,047,883, Cl. 432-14.000.

Watkins, Charles W.: *See—*
Paterson, James G. T.; Watkins, Charles W.; and Duckworth, Grover G., Jr., 4,047,271, Cl. 28-220.000.

Watkins-Johnson Company: *See—*
Zublin, Kurt E.; and Wilser, Walter T., 4,048,588, Cl. 331-96.000.

Watkins, Joseph Albert, to Eastman Kodak Company. Apparatus for moving a tool into and out of engagement with a workpiece. 4,048,004, Cl. 156-580.100.

Watson, W. Gary; and Breedis, John F., to Olin Corporation. Processing chromium-containing precipitation hardenable copper base alloys. 4,047,980, Cl. 148-12.70C.

Watts, Eric Alfred, to Beecham Group Limited. Chroman derivatives. 4,048,317, Cl. 424-267.000.

Watts, John D.: *See—*
Cleveland, John T.; Chappell, Walter L.; and Watts, John D., 4,047,695, Cl. 251-122.000.

Wean United, Inc.: *See—*
Greenberger, Joseph Irwin, 4,047,985, Cl. 148-153.000.

Weaver, Lelland A. C.: *See—*
Liu, Chi-sheng; and Weaver, Lelland A. C., 4,048,587, Cl. 331-94.50G.

Webber, Susan Anne: *See—*
Crochiere, Ronald Eldon; Flanagan, James Loton; and Webber, Susan Anne, 4,048,443, Cl. 179-1.0SA.

Weber, Max, to Sulzer Brothers Limited. Gas heated steam generator. 4,047,506, Cl. 122-32.000.

Weber, Max, to Sulzer Brothers Limited. Heat exchanger utilizing a vaporized heat-containing medium. 4,047,562, Cl. 165-111.000.

Wegemund, Bernd; and Galinke, Joachim, to Henkel & Cie GmbH. Anaerobically compositions containing acrylic ester-acids. 4,048,259, Cl. 260-881.000.

Weglein, Rolf D., to Hughes Aircraft Company. Surface acoustic wave filter. 4,048,594, Cl. 333-72.000.

Wegner, Carl R., to Telesonics, Inc. Stereophonic television sound transmission system. 4,048,654, Cl. 358-144.000.

Wegner, Hans-Georg; and Kunert, Maximilian, to Deutsche Texaco Aktiengesellschaft. Process for regenerating aqueous urea solutions. 4,048,055, Cl. 208-25.000.

Weighton, David M.: *See—*
Baker, Maurice W.; Kerry, John C.; Nichol, Kenneth J.; Marshall, John R.; Weighton, David M.; and Kozlik, Antonin, 4,048,188, Cl. 548-341.000.

Weilbacher, Jean-Claude, to Societe France-Americaine de Constructions Atomiques-Framatome. Method of and apparatus for checking the dimensions of the extensions of the control rods of a nuclear reactor. 4,048,009, Cl. 176-19.00R.

Weill, Paul B.; and Darby, Paul L., to United States of America, Navy. Liquid monopropellant compositions. 4,047,988, Cl. 149-74.000.

Weintraub, Burton L.; and Buda, Salvatore, to Berger Industries, Inc. Light walled conduit. 4,047,743, Cl. 285-340.000.

Weir, Donald H.: *See—*
Witte, Donald H.; and Weir, Donald H., 4,047,340, Cl. 52-169.700.

Weisbach, Jerry A.: *See—*
Cooper, David J.; Hoover, John R. E.; and Weisbach, Jerry A., 4,048,430, Cl. 536-17.000.

Weiss, Herbert: *See—*
Gudden, Friedrich; and Weiss, Herbert, 4,048,502, Cl. 250-370.000.

Weitz, Hans-Martin; Kahr, Kurt; and Fischer, Rolf, to BASF Aktiengesellschaft. Manufacture of 1-substituted oximino cyclo alkenes-(1). 4,048,165, Cl. 544-166.000.

Weitze, Artur; and Sapunarow, Michail, to Siemens Aktiengesellschaft. Process for the production of a multi-chip wiring arrangement. 4,047,290, Cl. 29-625.000.

Wells, Alan W.: *See—*
Kranc, Stanley J.; Wells, Alan W.; and Hackett, David E., 4,047,664, Cl. 239-120.000.

Welter, Neil E.: *See—*
Carson, Lansing M.; and Welter, Neil E., 4,048,566, Cl. 325-329.000.

Werbenec, Jean-Pierre: *See—*
Pigerol, Charles; Eymard, Pierre; Vernieres, Jean-Claude; and Werbenec, Jean-Pierre, 4,048,334, Cl. 424-325.000.

Wertli, Josef; and Matter, Paul, to WkS-Schweisstechnik Willy Kalnbach, Firma. Apparatus for generating and regulating welding currents. 4,048,467, Cl. 219-131.00R.

Wesenberg, Hans Ulrich. Balloon and parachute toy. 4,047,324, Cl. 46-86.00R.

Wessman, Leonard A. Recessed lighting fixture. 4,048,491, Cl. 240-78.00H.

West Chemical Products, Incorporated: *See—*
Winicov, Murray A.; and Cantor, Abraham, 4,048,336, Cl. 424-334.000.

West Point Pepperell, Inc.: *See—*
Hale, Ferrell Daniel; and Crowder, Charles H., 4,048,368, Cl. 428-235.000.

Westcott, Vernon C., to Trans-Sonics, Incorporated. Method and apparatus for segregating particulate matter. 4,047,814, Cl. 356-38.000.

Westhoff, Hermann: *See—*
Brokmann, Manfred; Sanders, Kurt; Sanders, Dieter; and Westhoff, Hermann, 4,047,824, Cl. 403-209.000.

Westinghouse Electric Corporation: *See—*
Emmerich, Werner S., 4,048,117, Cl. 252-513.000.
Gary, Wardell; and Lange, Emroy W., 4,048,522, Cl. 307-293.000.
Harris, Walter R., 4,048,550, Cl. 318-356.000.
Jacomini, Omar J., 4,048,637, Cl. 343-7.700.
Liu, Chi-sheng; and Weaver, Lelland A. C., 4,048,587, Cl. 331-94.50G.
Stumbar, James P.; Carl, Daniel E.; and Lee, Suh Y., 4,047,972, Cl. 134-2.000.
Thompson, Francis T.; and Brennen, Michael B., 4,048,521, Cl. 307-291.000.
Tragesser, Charles W., 4,048,457, Cl. 200-150.00R.
Vale, Christopher R., 4,048,595, Cl. 333-72.000.
Whitney, Eugene C., 4,048,528, Cl. 310-54.000.
Winkler, Charles L., 4,047,596, Cl. 187-29.00R.
Zona, Michael R.; Ruffing, Charles R.; and Johrde, Paul S., 4,047,867, Cl. 425-117.000.

Westphal, Jochen, to Bayer Aktiengesellschaft. Monoazo dyestuffs derived from p-sulfo-halophenyl diazo moiety and p-amino-O-alkyl coupler moiety. 4,048,154, Cl. 260-205.000.

Wetzel, Bernd: *See—*
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.

Wetzel, Helmut: *See—*
Wilckens, Hellmut; and Wetzel, Helmut, 4,047,579, Cl. 175-7.000.

Weyker, Robert George: *See—*
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerard, 4,047,991, Cl. 156-62.600.

Whaley, Robert L.; and Day, James L., to Pullman Incorporated. Chassis lock for container trailer. 4,047,748, Cl. 296-35.00A.

Wheeler, Anthony A. Coaches field analysis kit. 4,047,308, Cl. 35-29.00R.

White, Charles Arthur John, to Chloride Group Limited. Multicell electric batteries. 4,048,400, Cl. 429-160.000.

White, Dwain M.: *See—*
Hay, Allan S.; and White, Dwain M., 4,048,143, Cl. 260-47.0ET.

White, James H.: *See—*
Voorheis, Temple S.; and White, James H., 4,047,489, Cl. 110-15.000.

White, Martin; and Boonthanoom, Niyom, to National Research Development Corporation. Composite metal polymer films. 4,048,349, Cl. 427-58.000.

Whitehill, Kenneth Jack. Adjustable dental recliner. 4,047,758, Cl. 297-284.000.

Whitney, Eugene C., to Westinghouse Electric Corporation. Starting motor for large inertia load. 4,048,528, Cl. 310-54.000.

Whittaker, John: *See—*
Blakey, Rene C.; Riddell, Robert G.; Whittaker, John; and Wilson, John A., 4,048,380, Cl. 428-511.000.
Wiand, Richard K. Metal-plated abrasive product and method of manufacturing the product. 4,047,902, Cl. 51-295.000.
Wicht, Paul: *See—*
Brunold, Marcel; Hering, Klaus; Wicht, Paul; Vonlanthen, Christian; Kislig, Jurg; and Volker, Theodor, 4,048,130, Cl. 260-29.6NR.
Widmann, Dietrich, to Siemens Aktiengesellschaft. Process for the production of a bipolar integrated circuit. 4,047,975, Cl. 148-1.500.
Wiedenroth, Wolfgang: *See—*
Kotthoff, Winfried; and Wiedenroth, Wolfgang, 4,047,558, Cl. 164-309.000.
Wika, Gilbert L. Portable stand for reloading presses. 4,047,685, Cl. 248-158.000.
Wilckens, Hellmut; and Wetzel, Helmut, to Rheinstahl AG. Sea drilling jig. 4,047,579, Cl. 175-7.000.
Wilcox, Glade; and Packard, Keith A., to Robyn International, Inc. Apparatus for preventing simultaneous transmission and channel selection in a transmitter or transceiver. 4,048,561, Cl. 325-22.000.
Wilcox, Howard A.: *See—*
Hughes, Richard Swart; and Wilcox, Howard A., 4,047,795, Cl. 350-96.00C.
Wiles, David M.: *See—*
Carlsson, David J.; Suprunchuk, Tony; and Wiles, David M., 4,048,367, Cl. 428-220.000.
Wilke, Gunther; and Heimbach, Paul, to Studiengesellschaft Kohle m.b.H. Production of alicyclic unsaturated compounds having pendent functional groups. 4,048,214, Cl. 560-128.000.
Wilkens, James B., to SCM Corporation. High-conversion drift-free batch-type addition copolymerization. 4,048,413, Cl. 526-66.000.
Willcox, Frederick P. Articulated ribbon-guiding structure. 4,047,607, Cl. 197-151.000.
Willcox, Frederick P. Compliant ribbon-guiding structure. 4,047,608, Cl. 197-151.000.
William Wrigley, Jr. Co.: *See—*
Litchfield, John H.; and Vely, Victor G., 4,048,299, Cl. 424-49.000.
Williams, David Alan; Sperber, Karl; and Stoutz, Calvin Owen, to Eastman Kodak Company. Turn-on method and apparatus for ultrasonic operations. 4,047,992, Cl. 156-73.100.
Williams, David J.: *See—*
Pfister, Gustav R.; and Williams, David J., 4,047,945, Cl. 96-1.00R.
Williams, Frank J., III: *See—*
Johnson, Donald S.; and Williams, Frank J., III, 4,048,190, Cl. 260-326.00N.
Williams, James M.: *See—*
Rollason, Peter H.; and Williams, James M., 4,047,424, Cl. 73-52.000.
Williams, Jerry K.; and Landmesser, Franklin D., to General Motors Corporation. Cambering vehicle with hydraulic stabilizer and equalizer. 4,047,732, Cl. 280-287.000.
Williams, John K., to Xerox Corporation. Recovery of selenium and selenium alloys by hydraulic lathing. 4,047,973, Cl. 134-10.000.
Williams, Nathan P., to United States of America, Army. Initiator for use in laser beam ignition of solid propellants. 4,047,483, Cl. 102-70.20A.
Williamson, John Peter Hugh: *See—*
Morriss, Harry Augustus; and Williamson, John Peter Hugh, 4,047,970, Cl. 106-299.000.
Willis, Gordon G.: *See—*
Boozalis, Theodore S.; Cragar, Darryl E.; Ivy, John B.; and Willis, Gordon G., 4,048,241, Cl. 260-658.00R.
Wills, David C.: *See—*
Lawter, Ray L.; Shooter, Kenneth L.; and Wills, David C., 4,048,476, Cl. 235-61.11D.
Wilmot, Kenneth, to Neotechnic Engineering Limited. Drinking stations for poultry and the like. 4,047,503, Cl. 119-75.000.
Wilser, Walter T.: *See—*
Zublin, Kurt E.; and Wilser, Walter T., 4,048,588, Cl. 331-96.000.
Wilson, John. Framing form and clamp. 4,047,710, Cl. 269-42.000.
Wilson, John A.: *See—*
Blakey, Rene C.; Riddell, Robert G.; Whittaker, John; and Wilson, John A., 4,048,380, Cl. 428-511.000.
Wilson, John Charles, to Eastman Kodak Company. Radiation sensitive polymers of oxygen-substituted maleimides and elements containing same. 4,048,146, Cl. 260-63.0UY.
Wilson, Joseph Townsend, III: *See—*
Walsh, James Calvin; Wilson, Joseph Townsend, III; and Wolfe, Bruce Allen, 4,048,639, Cl. 346-75.000.
Wimmer, Peter. Method of and apparatus for improving smoking properties of tobacco products. 4,047,535, Cl. 131-23.00R.
Winderl, Siegfried: *See—*
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,048,116, Cl. 252-470.000.
Windsunwatt, Inc.: *See—*
Magoveny, George S.; and Forgo, Eric J., 4,047,834, Cl. 415-3.000.
Winicov, Murray A.; and Cantor, Abraham, to West Chemical Products, Incorporated. Means for killing bacterial spores with glutaraldehyde sporicidal compositions. 4,048,336, Cl. 424-334.000.
Winkler, Charles L., to Westinghouse Electric Corporation. Elevator system. 4,047,596, Cl. 187-29.00R.
Winter, Wilhelm; and Held, Artur, to FORM-PLAST GmbH. Mold for concrete test cube. 4,047,690, Cl. 249-66.00A.
Wisdom, Gerald F. Apparatus for lowering a trailer to the ground. 4,047,699, Cl. 254-86.00H.
Wise, John J.: *See—*
Garwood, William E.; Jacob, Solomon M.; Kuo, James C.; and Wise, John J., 4,048,250, Cl. 260-683.430.
Wisotzky, Otto G.: *See—*
Blackburn, Tom L.; and Wisotzky, Otto G., 4,048,576, Cl. 330-29.000.
Wisotzky, Reuben; and Bolger, John C., to Pandel-Bradford, Inc. Embossed suede material and method of preparing same. 4,048,269, Cl. 264-25.000.
Witte, Arvel B.; Broadwell, James E.; and Hook, Dale L., to TRW Inc. Chemical laser with mixing enhancement device for power improvement. 4,048,586, Cl. 331-94.50D.
Witte, Donald H.; and Weir, Donald H., to Fox Pool Corporation. Swimming pool modular constructure. 4,047,340, Cl. 52-169.700.
WkS-Schweisstechnik Willy Kalnbach, Firma: *See—*
Wertli, Josef; and Matter, Paul, 4,048,467, Cl. 219-131.00R.
Wohlford, William P., to United States of America, Army. Telescoped explosive driver. 4,047,465, Cl. 89-8.000.
Woitun, Eberhard: *See—*
Maier, Roland; Woitun, Eberhard; Wetzel, Bernd; Reuter, Wolfgang; Goeth, Hanns; and Lechner, Uwe, 4,048,306, Cl. 424-180.000.
Wojcik, Ronald Thomas; and Ruckel, Erwin Richard, to Arizona Chemical Company. Antimony halide catalyst system. 4,048,095, Cl. 252-429.00R.
Wolbrink, David W., to Broan Manufacturing Co., Inc. Deodorizer for trash compactors. 4,047,775, Cl. 312-211.000.
Wolf, Gerhard Dieter; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Diols containing sulphonic acid groups based on dihydroxy alkenes. 4,048,221, Cl. 260-512.00C.
Wolf, Johann, to Johann Wolf Gesellschaft m.b.H. KG. Fixture for use in the formation of a discharge opening of a fodder silo. 4,047,691, Cl. 249-97.000.
Wolfangel, Robert George, to Mallinckrodt, Inc. Radiopharmaceutical scanning agents. 4,048,296, Cl. 424-1.000.
Wolfe, Bruce Allen: *See—*
Walsh, James Calvin; Wilson, Joseph Townsend, III; and Wolfe, Bruce Allen, 4,048,639, Cl. 346-75.000.
Wolfe, David L.; and Sexton, Arthur R., to Dow Chemical Company, The. Process for the dealkylation of t-butyl and t-amyl ethers on polymeric backbones. 4,048,237, Cl. 260-615.00B.
Wolff, Otto E., to Polaroid Corporation. Method for forming a slurry battery cell. 4,047,289, Cl. 29-623.400.
Wolfgang, Lozure Gene: *See—*
Kao, Charles Kuen; and Wolfgang, Lozure Gene, 4,047,796, Cl. 350-96.00C.
Wolverine Aluminum Corporation: *See—*
DeSantis, Raymond P., 4,047,864, Cl. 425-78.000.
Wondolowski, Lawrence: *See—*
Gibbons, John P.; and Wondolowski, Lawrence, 4,048,126, Cl. 260-17.200.
Gibbons, John P.; and Wondolowski, Lawrence, 4,048,127, Cl. 260-17.200.
Wong, James, Jr.: *See—*
Cole, Edward L.; Hess, Howard V.; and Wong, James, Jr., 4,047,898, Cl. 44-1.00G.
Wood, Eric, to Insituform (Pipes & Structures) Ltd. System for generating power from wave motions of the sea. 4,048,512, Cl. 290-53.000.
Wood, Laurier A. Apparatus and method for repeatable transfers of liquid deposits. 4,047,498, Cl. 118-243.000.
Worrall, Michael John, to British Ceca Company Limited, The. Control systems for adsorber units. 4,047,904, Cl. 55-18.000.
Wotruba, Gottfried: *See—*
Hoffmann, Kurt; Meusburger, Guenther; and Wotruba, Gottfried, 4,048,519, Cl. 307-221.00D.
Wright, George W., to Crown Cork & Seal Company, Inc. Means and method for inspecting in-process aerosol container closures. 4,047,613, Cl. 209-74.00M.
Wright, James H. Electroslag remelting apparatus for rebuilding grouser bars. 4,047,557, Cl. 164-252.000.
Wright, Roger N., to Allegheny Ludlum Industries, Inc. Duplex ferrit IC-martensitic stainless steel. 4,047,941, Cl. 75-126.00B.
Wulff, Allan. Darkroom timer. 4,047,375, Cl. 58-21.130.
Wurmb, Rolf; Leutner, Bernd; Seydl, Wolfgang; Schlimper, Hans-Ulrich; and Sterzel, Hans-Josef, to BASF Aktiengesellschaft. Polyester molding compositions of reduced flammability. 4,048,135, Cl. 260-40.00R.
Wyss, Samuel G. Towing mechanism for a ski lift. 4,047,487, Cl. 104-173.0ST.
Xerox Corporation: *See—*
Allis, Robert F.; and Capaccio, Vincent A., 4,047,811, Cl. 355-14.000.
Chu, Joseph Y. C.; and Gunther, Wolfgang H. H., 4,047,947, Cl. 96-1.300.
Hauman, Dewey H., Jr., 4,047,885, Cl. 432-60.000.
Hogan, James W., 4,047,812, Cl. 355-76.000.
Horgan, Anthony M., 4,047,948, Cl. 96-1.50R.
Horgan, Anthony M., 4,047,949, Cl. 96-1.50R.
Jacobson, Charles L., 4,048,571, Cl. 328-20.000.
Lang, John M., 4,047,793, Cl. 350-7.000.
Lu, Chin H., 4,047,943, Cl. 96-1.0LY.
Morgan, Paul F., 4,047,810, Cl. 355-3.00R.
Pfister, Gustav R.; and Williams, David J., 4,047,945, Cl. 96-1.00R.
Williams, John K., 4,047,973, Cl. 134-10.000.
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani,

Kazuo, to Dai Nippon Toryo Kabushiki Kaisha. Nematic liquid crystal compositions. 4,047,803, Cl. 350-160.0LC.
Yaguchi, Mashachika; and Nakamura, Kenji, to Dai Nippon Toryo Kabushiki Kaisha. Nematic liquid crystal compositions. 4,048,088, Cl. 252-299.000.
Yahiro, Teruo; and Yoshida, Hiroshi, to Chemical Grout Company, Ltd.; and Kajima Corporation. High-velocity jet digging method. 4,047,580, Cl. 175-67.000.
Yakovlev, Alexandr Ivanovich: *See—*
Borzyak, Jury Gordeevich; Borisenko, Alexandr Ivanovich; Tjufilin, German Mikhailovich; Rolik, Alexandr Ivanovich; and Yakovlev, Alexandr Ivanovich, 4,048,280, Cl. 264-102.000.
Yamada, Kenji: *See—*
Nakajima, Fumio; Machida, Takayasu; and Yamada, Kenji, 4,048,548, Cl. 318-138.000.
Yamada, Yoshio; and Wada, Yoneji. Liquid filtering device. 4,048,071, Cl. 210-90.000.
Yamahara, Noboru: *See—*
Arakawa, Masatoshi; Ohno, Ryotaro; Ishikawa, Katuhiro; Yamahara, Noboru; and Matsui, Hisashi, 4,048,147, Cl. 260-67.0UA.
Yamaki, Takasi: *See—*
Arai, Yoshi; Kimura, Kazuo; Sato, Hisato; Yamaki, Takasi; Morita, Katsuhiko; Ohzeki, Masanao; Takatsu, Haruyoshi; Fujita, Yutaka; and Tazume, Masayuki, 4,048,089, Cl. 252-299.000.
Yamamoto, Hiroyuki: *See—*
Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, 4,048,197, Cl. 260-346.300.
Yamamoto, Hisao: *See—*
Yamamoto, Michihiro; Katayama, Shigenari; Koshiba, Masao; and Yamamoto, Hisao, 4,048,168, Cl. 260-251.0QB.
Yamamoto, Kiyoshi: *See—*
Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, 4,048,021, Cl. 203-91.000.
Yamamoto, Michihiro; Katayama, Shigenari; Koshiba, Masao; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Process for preparing 1-polyhaloalkyl-3,4-dihydro-2-(1H)-quinazolinones. 4,048,168, Cl. 260-251.0QB.
Yamamoto, Mitsuyoshi: *See—*
Nara, Takashi; Okachi, Ryo; Yamamoto, Mitsuyoshi; Mori, Yasuki; Sato, Moriyuki; Sugimoto, Masahiro; and Shimizu, Yoshiaki, 4,048,015, Cl. 195-96.000.
Yamamoto, Nobuo: *See—*
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, 4,047,958, Cl. 96-87.00R.
Yamamoto, Shunji: *See—*
Irie, Yutaka; Murata, Tomoji; Shibazaki, Kenji; Yamamoto, Shunji; Shimizu, Shigemitsu; and Tokura, Yukio, 4,048,666, Cl. 361-189.000.
Yamanaka, Teruo: *See—*
Ito, Hajime; Yamanaka, Teruo; and Ozeki, Osamu, 4,048,613, Cl. 340-53.000.
Yamashita, Gentaro: *See—*
Takamoto, Hiromitsu; Yamamoto, Kiyoshi; Taneda, Nobuo; Matsubayashi, Toru; and Yamashita, Gentaro, 4,048,021, Cl. 203-91.000.
Yamatani, Wataru, to Sony Corporation. Receiver automatic gain control system. 4,048,569, Cl. 325-414.000.
Yamazaki, Tomio, to Tomy Kogyo Co., Inc. Baton twirling figure. 4,047,325, Cl. 46-106.000.
Yanagida, Hiroaki; and Ohashi, Tsuneo, to Fujitok Co., Ltd. Method for treating a glass surface. 4,047,971, Cl. 134-2.000.
Yanagisawa, Hiroaki; Ando, Akiko; Fukushima, Masami; and Nakao, Hideo, to Sankyo Company Limited. Process for preparing 7 α-alkoxycephalosporin derivatives. 4,048,155, Cl. 542-422.000.
Yang, Yue-Chyou, to T. Y. Lin International. Precast concrete pile, and cofferdams. 4,047,389, Cl. 61-59.000.
Yanovsky, Viktor Yakovlevich: *See—*
Karpov, Valentin Mikhailovich; Santo, Vladimir Rezhevich; Yanovsky, Viktor Yakovlevich; Mikhailov, Anatoly Ivanovich; and Belyaev, Mikhail Fedorovich, 4,047,428, Cl. 73-141.00A.
Yeager, Marvin Leo, to AMP Incorporated. Rotary cam low insertion force connector with top actuation. 4,047,782, Cl. 339-75.0MP.
Yokota, Takeshi; Suzuki, Nobuyuki; Sowa, Tsuneo; Sasaki, Yasuharu; and Ono, Yasutaka, to Asahi Kasei Kogyo Kabushiki Kaisha. Cyclic adenosine monophosphate 8-substituted derivatives. 4,048,307, Cl. 424-180.000.
Yomogida, Toshihiko, to Toyoda-Koki Kabushiki-Kaisha. Programmable sequence controller. 4,048,622, Cl. 364-900.000.
Yoneyama, Masakazu; Usami, Toshimasa; Ino, Shiyoichi; Sata, Yoshiteru; and Yamamoto, Nobuo, to Fuji Photo Film Co., Ltd. Photographic sensitive materials. 4,047,958, Cl. 96-87.00R.
Yoshida, Hiroshi: *See—*
Yahiro, Teruo; and Yoshida, Hiroshi, 4,047,580, Cl. 175-67.000.
Yoshida, Katsuyoshi; and Kitajima, Yukio, to Nippon Steel Corporation. Method of continuous galvanizing steel strip on partial or one side. 4,047,977, Cl. 148-6.200.
Yoshida Kogyo Kabushiki Kaisha: *See—*
Matsuda, Yoshio, 4,047,265, Cl. 24-205.16C.
Matsuda, Yoshio; and Fujisaki, Yoshinori, 4,047,402, Cl. 66-195.000.
Ney, David Marshall, 4,047,756, Cl. 297-219.000.
Takahashi, Kihei; and Higuchi, Yositaka, 4,047,264, Cl. 24-205.11R.
Yoshida, Shinya, to Omron Tateisi Electronics Company. Apparatus for checking the user of a card in card-actuated machines. 4,048,475, Cl. 235-61.70B.
Yoshikawa, Shinsuke; Terasaki, Syuuzi; and Sasaki, Tohru, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method of polarizing a thermoplastic resin film. 4,047,998, Cl. 156-275.000.
Yoshimoto, Hataaki: *See—*
Itatani, Hiroshi; Kashima, Mikito; Matsuda, Masaoki; Yoshimoto, Hataaki; and Yamamoto, Hiroyuki, 4,048,197, Cl. 260-346.300.
Yoshinaka, Shigeo; Uchiyama, Seiji; and Doya, Masaharu, to Mitsubishi Gas Chemical Company, Inc. Process for preparing perchloromethylbenzene. 4,048,033, Cl. 204-158.0HA.
Young, Charles Edwin, to Bell Telephone Laboratories, Incorporated. Error control for digital multipoint circuits. 4,048,441, Cl. 178-73.000.
Young, D. Craig; and Zadoks, Abraham L., to Caterpillar Tractor Co. Internally insulated bellows assembly. 4,047,740, Cl. 285-47.000.
Young, Gladstone F.: *See—*
Seiden, Lewis J.; Landesberg, William; and Young, Gladstone F., 4,048,672, Cl. 364-200.000.
Young, Sheldon E., to Vibro/Dynamics Corporation. Load-sensing and adjusting method for operable machines. 4,047,427, Cl. 73-141.00A.
Young, Wilbur E. Tiltable and extensible trailer. 4,047,630, Cl. 214-506.000.
Yu, Terry Ta-Jen: *See—*
Counsell, Raymond E.; and Yu, Terry Ta-Jen, 4,048,297, Cl. 424-1.000.
Yung, Gordon H. K.: *See—*
Sibley, Murray J.; Yung, Gordon H. K.; and Urrea, Petronio D., 4,048,122, Cl. 252-541.000.
Yutaka Denki Saisakusho: *See—*
Okumura, Sosuke, 4,047,913, Cl. 55-418.000.
Zacher, Wieland: *See—*
Mietzner, Franz Georg; Pfleger, Klaus; Gropper, Hans; Buechner, Oskar; Boetticher, Klaus; and Zacher, Wieland, 4,048,411, Cl. 526-64.000.
Zadoks, Abraham L.: *See—*
Young, D. Craig; and Zadoks, Abraham L., 4,047,740, Cl. 285-47.000.
Zalis, Albert A., to Houdaille Industries, Inc. Stuffing box for high density screw pump and pump incorporating same. 4,047,858, Cl. 418-201.000.
Zeffero, Robert J.: *See—*
Lambitz, Robert H.; and Zeffero, Robert J., 4,047,749, Cl. 296-39.00R.
Zefflamb Industries, Inc.: *See—*
Lambitz, Robert H.; and Zeffero, Robert J., 4,047,749, Cl. 296-39.00R.
Zeidler, Johannes; and Von Borcke, Bernd, to Alfred Gutmann Gesellschaft fur Maschinenbau. Centrifugal impeller for sandblasting installations. 4,047,843, Cl. 416-185.000.
Zenith Radio Corporation: *See—*
Bowler, John W.; Karner, Kenneth E.; Pittenger, Daniel I.; and Schwartz, Donald A., 4,048,669, Cl. 361-391.000.
Hofmann, Judson A., 4,048,655, Cl. 358-148.000.
Zenzie, Henry: *See—*
Hansen, Elwood F.; Goldberg, Arnold; Zenzie, Henry; and Giroward, Kermit, 4,047,914, Cl. 55-488.000.
Zerpner, Dieter: *See—*
Haag, Horst; Nordsiek, Karl-Heinz; Streck, Roland; and Zerpner, Dieter, 4,048,262, Cl. 260-889.000.
Zetlmeisl, Michael J.: *See—*
May, Walter R.; Zetlmeisl, Michael J.; and Koch, Kenneth W., 4,047,875, Cl. 431-3.000.
Zillman, Jack H. Electrical component for providing integrated inductive-capacitive networks. 4,048,593, Cl. 333-70.00R.
Zimmerman, Joseph, to Du Pont de Nemours, E. I., and Company. Washing process for inorganic acid containing polyamide fibers. 4,048,279, Cl. 264-184.000.
Zimmerman, Richard Henry, to AMP Incorporated. Conductor patterned substrate providing stress release during direct attachment of integrated circuit chips. 4,048,438, Cl. 174-68.500.
Ziofsky, Henry; and Sinclair, Brett Jason. Guide for setting up artificial teeth. 4,047,303, Cl. 32-40.00R.
Zirk, Robert Louis, Sr., to Illinois Tool Works Inc. Induction heating core structure and method of heating. 4,048,458, Cl. 219-10.790.
Zlupko, John E.: *See—*
Bailey, Cecil; Balchunas, Walter C.; and Zlupko, John E., 4,048,348, Cl. 427-34.000.
Zoldi, Jozsef: *See—*
Szepesi, Karoly; Meszaros, Lajos; Majer, Janos; Zoldi, Jozsef; and Entzmann, Karl, 4,048,285, Cl. 423-132.000.
Zolzer, Karlheinz: *See—*
Baron, Gerhard; Bierbach, Herbert; Hafke, Carl; and Zolzer, Karlheinz, 4,047,901, Cl. 48-86.00R.
Zona, Michael R.; Ruffing, Charles R.; and Johrde, Paul S., to Westinghouse Electric Corporation. Casting assembly for stator coils. 4,047,867, Cl. 425-117.000.
Zublin, Kurt E.; and Wilser, Walter T., to Watkins-Johnson Company. Yig-tuned bulk semiconductor oscillator. 4,048,588, Cl. 331-96.000.
Zuccatti, Joyce L. Spectacles having adjustable temples. 4,047,809, Cl. 351-118.000.
zurStrassen, Heinrich; and Rauschenfels, Eberhard, to Dyckerhoff Zementwerke AG. Method for the production of synthetic wollastonite materials. 4,047,968, Cl. 106-281.00R.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF SEPTEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aker, John L.; Geist, Donald L.; Kittle, Freddie R.; and Berry, Fred M., to Kustom Electronics, Inc. Method and apparatus for digitally measuring speed. Re. 29,401, Cl. 343-8.000.

Amerace Corporation: *See—*
Heenan, Sidney A., Re. 29,396, Cl. 204-281.000.

Anderson Company, The: *See—*
Moorhead, John P.; and Stratton, Donald W., Re. 29,392, Cl. 15-250.420.

Bald, Robert E.: *See—*
Swanson, Harold V.; and Bald, Robert E., Re. 29,394, Cl. 277-229.000.

Becker, Reinhard, to Deere & Company. Apparatus for separating and/or counting individual elements of a plurality. Re. 29,393, Cl. 221-211.000.

Berry, Fred M.: *See—*
Aker, John L.; Geist, Donald L.; Kittle, Freddie R.; and Berry, Fred M., Re. 29,401, Cl. 343-8.000.

Deere & Company: *See—*
Becker, Reinhard, Re. 29,393, Cl. 221-211.000.

Elektriska Svetsningsaktiebolaget: *See—*
Ericsson, Rolf, Re. 29,400, Cl. 219-135.000.

Ericsson, Rolf, to Elektriska Svetsningsaktiebolaget. Direct current power supply for manual arc welding. Re. 29,400, Cl. 219-135.000.

Geist, Donald L.: *See—*
Aker, John L.; Geist, Donald L.; Kittle, Freddie R.; and Berry, Fred M., Re. 29,401, Cl. 343-8.000.

Heenan, Sidney A., to Amerace Corporation. Pin having nonaligned cube axis and pin axis and bundle of such pins. Re. 29,396, Cl. 204-281.000.

Inoue, Kiyoshi. Servosystem for electrical machining processes. Re. 29,398, Cl. 219-69.00G.

Inoue, Kiyoshi. Servosystem for gap electrical machining processes (especially electroerosion). Re. 29,399, Cl. 219-69.00G.

Interpace Corporation: *See—*
Swanson, Harold V.; and Bald, Robert E., Re. 29,394, Cl. 277-229.000.

Kittle, Freddie R.: *See—*
Aker, John L.; Geist, Donald L.; Kittle, Freddie R.; and Berry, Fred M., Re. 29,401, Cl. 343-8.000.

Kustom Electronics, Inc.: *See—*
Aker, John L.; Geist, Donald L.; Kittle, Freddie R.; and Berry, Fred M., Re. 29,401, Cl. 343-8.000.

Moorhead, John P.; and Stratton, Donald W., to Anderson Company, The. Windshield wiper blade structure. Re. 29,392, Cl. 15-250.420.

Nippon Electric Company, Limited: *See—*
Yonezu, Hiroo, Re. 29,395, Cl. 148-175.000.

Stratton, Donald W.: *See—*
Moorhead, John P.; and Stratton, Donald W., Re. 29,392, Cl. 15-250.420.

Swanson, Harold V.; and Bald, Robert E., to Interpace Corporation. Corrosion protective band for underground pipe joints with metal parts. Re. 29,394, Cl. 277-229.000.

Yamazaki, Masahiko. Separating apparatus. Re. 29,397, Cl. 210-316.000.

Yonezu, Hiroo, to Nippon Electric Company, Limited. Method of fabricating a double heterostructure injection laser utilizing a stripe-shaped region. Re. 29,395, Cl. 148-175.000.

LIST OF PLANT PATENTEES

Duffett, William E.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,104, Cl. 74.000.

Grob, Adolf, to Mikkelsens, Inc. Kalanchoe plant. 4,101, 9-13-77, Cl. 68.000.

Grob, Adolf, to Mikkelsens, Inc. Kalanchoe plant. 4,102, 9-13-77, Cl. 68.000.

Grob, Adolf, to Mikkelsens, Inc. Kalanchoe plant. 4,103, 9-13-77, Cl. 68.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,104, 9-13-77, Cl. 74.000.

Jorgensen, Sigvart, to Patterson's Flowers, Inc. Chrysanthemum plant. 4,105, 9-13-77, Cl. 76.000.

Mikkelsens, Inc.: *See—*
Grob, Adolf, 4,101, Cl. 68.000.
Grob, Adolf, 4,102, Cl. 68.000.
Grob, Adolf, 4,103, Cl. 68.000.

Patterson's Flowers, Inc.: *See—*
Jorgensen, Sigvart, 4,105, Cl. 76.000.

Yoder Brothers, Inc.: *See—*
Jessel, Walter H., Jr.; and Duffett, William E., 4,104, Cl. 74.000.

LIST OF DESIGN PATENTEES

AB Bofors: *See—*
Dahlberg, Sten Johan; Korpi, Jouko Kalevi; and Larsson, Ulf Robert, 245,780, Cl. D15-32.000.

Alseth, Gilmore N.; and Hipp, Richard D., Jr., to Minnesota Mining & Manufacturing Company. Toner powder supply container. 245,761, 9-13-77, Cl. D9-224.000.

American Optical Corporation: *See—*
Burkhardt, Wayne W.; and Fischlein, Robert R., 245,781, Cl. D16-65.000.

Askew, Aubrey, to Dunlop Limited. Shoe. 245,732, 9-13-77, Cl. D2-310.000.

Askew, Aubrey, to Dunlop Limited. Shoe. 245,733, 9-13-77, Cl. D2-310.000.

Bargsten, Betty J. Chest protector for motorcycle riders. 245,731, 9-13-77, Cl. D2-27.000.

Bayerische Motoren Werke Aktiengesellschaft: *See—*
Muth, Hans A., 245,775, Cl. D12-205.000.

Box, Theodor. Case for holding containers carrying bottles. 245,760, 9-13-77, Cl. D9-177.000.

Branch, Robert P.; and Monell, Charles M. Surgical hair implanter. 245,788, 9-13-77, Cl. D24-26.000.

Breger, Carl-Arne, to Sandvik Aktiebolag. Hack saw. 245,754, 9-13-77, Cl. D8-96.000.

Bridgestone Tire Company Limited: *See—*
Nakano, Minoru; and Tezuka, Toshiro, 245,771, Cl. D12-146.000.

Brightbill, Keith E., to Murray Ohio Manufacturing Co., The. Combined bicycle seat and tank. 245,770, 9-13-77, Cl. D12-126.000.

Brooks, Ronald A. Bookshelf unit. 245,744, 9-13-77, Cl. D6-186.000.

Burkhardt, Wayne W.; and Fischlein, Robert R., to American Optical Corporation. Safety spectacles frame front. 245,781, 9-13-77, Cl. D16-65.000.

Chihara, Masao, to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha. Magnetic medical necklace. 245,769, 9-13-77, Cl. D11-13.000.

Cone, Richard E. Toy bear. 245,802, 9-13-77, Cl. D34-15.00B.

Cone, Richard E. Toy pelican. 245,803, 9-13-77, Cl. D34-15.00B.

Cone, Richard E. Toy whale. 245,804, 9-13-77, Cl. D34-15.00B.

Cone, Richard E. Toy seahorse. 245,805, 9-13-77, Cl. D34-15.00B.

Cone, Richard E. Toy dolphin. 245,806, 9-13-77, Cl. D34-15.00B.

Cone, Richard E.: *See—*
Meeker, Paul K.; and Cone, Richard E., 245,790, Cl. D24-45.000.

Contact Systems, Inc.: *See—*
Latanzi, Lewis A., 245,738, Cl. D6-24.000.

Cook, Victor J., Jr., to Sud Model Corporation. Chair. 245,739, 9-13-77, Cl. D6-69.000.

Copeland, Greg. Frame molding. 245,791, 9-13-77, Cl. D25-74.000.

Cruse, Arthur, to E. Gluck Corporation. Digital wristwatch. 245,766, 9-13-77, Cl. D10-38.000.

Dahlberg, Sten Johan; Korpi, Jouko Kalevi; and Larsson, Ulf Robert, to AB Bofors. Combined adapter and cutter edge unit for excavating, digging or bucket loading shovel. 245,780, 9-13-77, Cl. D15-32.000.

Daiwa Seiko, Inc.: *See*—
Okada, Kiyoshi, 245,784, Cl. D22-25.000.

D'Atri, Anthony C. Channel clamp. 245,753, 9-13-77, Cl. D8-72.000.

Davis, Patricia Lynn. Combined tennis racquet cover and ball holder. 245,813, 9-13-77, Cl. D87-1.00R.

Davis, Thomas R. Security box adapted for mounting within vehicles. 245,773, 9-13-77, Cl. D12-155.000.

Dellar, Fred Jay, to Superscope, Inc. One-point stereo microphone. 245,776, 9-13-77, Cl. D14-12.000.

DeMyer, Donald L. Gate for poultry cage. 245,793, 9-13-77, Cl. D30-2.000.

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Dougherty, Duayne D. Fence post. 245,792, 9-13-77, Cl. D25-77.000.

Drafton, Thomas L. Overhead console for vehicles. 245,772, 9-13-77, Cl. D12-155.000.

Dunlop Limited: *See*—
Askew, Aubrey, 245,732, Cl. D2-310.000.
Askew, Aubrey, 245,733, Cl. D2-310.000.

Dunnavan, Noel L. Luggage or similar article. 245,815, 9-13-77, Cl. D87-5.00F.

E. Gluck Corporation: *See*—
Cruse, Arthur, 245,766, Cl. D10-38.000.

Eaton Corporation: *See*—
Hollendorfer, Frank G., 245,797, Cl. D34-5.0GS.

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Famolare, Joseph P., Jr., 245,736, Cl. D2-320.000.

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Fischlein, Robert R.: *See*—
Burkhardt, Wayne W.; and Fischlein, Robert R., 245,781, Cl. D16-65.000.

Fisher, Gerald C.; and Scanland, Joseph E., to Roper Corporation. Cutter pin for mower. 245,757, 9-13-77, Cl. D8-391.000.

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Ikeda, Minoru, 245,747, Cl. D6-201.000.

Fritz, Wilbert G. Music sheet. 245,782, 9-13-77, Cl. D19-1.000.

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Gics Pharmaceuticals, Inc.: *See*—
Gics, Paul W., 245,811, Cl. D24-21.000.

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Segura, Daniel A., 245,763, Cl. D9-249.000.

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Haizinger, Ferdinand: *See*—
Gustavsson, Holger Bertil Ingvar; Hensler, Adolf; and Haizinger, Ferdinand, 245,800, Cl. D34-14.00B.

Haney, Ralph D.: *See*—
Shawen, Harley J.; Haney, Ralph D.; and Kohli, Jerry L., 245,777, Cl. D14-44.000.

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Gustavsson, Holger Bertil Ingvar; Hensler, Adolf; and Haizinger, Ferdinand, 245,800, Cl. D34-14.00B.

Herbert Richter, Metallwaren-Apparatebau: *See*—
Richter, Herbert, 245,740, Cl. D6-85.000.

Hewlett-Packard Company: *See*—
Lacelle, Leroy J., 245,810, Cl. D64-11.00B.

Hipp, Richard D., Jr.: *See*—
Alseth, Gilmore N.; and Hipp, Richard D., Jr., 245,761, Cl. D9-224.000.

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J. C. Penney Company, Inc.: *See*—
Ostroll, Henry D., 245,748, Cl. D6-252.000.

Jacobs, Raymond, to Kalso Systemet, Inc. Shoe sole. 245,734, 9-13-77, Cl. D2-320.000.

Jorgenscn, Donald H.; and Knigge, Larry A. Wall clock. 245,764, 9-13-77, Cl. D10-9.000.

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Nobata, Tetsuo, 245,779, Cl. D15-9.000.

Kalso Systemet, Inc.: *See*—
Jacobs, Raymond, 245,734, Cl. D2-320.000.

Kaplan, Norman C. Animal restrainer. 245,796, 9-13-77, Cl. D30-33.000.

Kitai, Isao, to Sharp Kabushiki Kaisha. Cash register. 245,809, 9-13-77, Cl. D52-4.00A.

Knigge, Larry A.: *See*—
Jorgenson, Donald H.; and Knigge, Larry A., 245,764, Cl. D10-9.000.

Kohli, Jerry L.: *See*—
Shawen, Harley J.; Haney, Ralph D.; and Kohli, Jerry L., 245,777, Cl. D14-44.000.

Korpi, Jouko Kalevi: *See*—
Dahlberg, Sten Johan; Korpi, Jouko Kalevi; and Larsson, Ulf Robert, 245,780, Cl. D15-32.000.

Lacelle, Leroy J., to Hewlett-Packard Company. Casing for an electronic calculator. 245,810, 9-13-77, Cl. D64-11.00B.

Langner, Frank F. Citizens band antenna. 245,778, 9-13-77, Cl. D14-86.000.

Larsson, Ulf Robert: *See*—
Dahlberg, Sten Johan; Korpi, Jouko Kalevi; and Larsson, Ulf Robert, 245,780, Cl. D15-32.000.

Latanzi, Lewis A., to Contact Systems, Inc. Electronic dip dispenser. 245,738, 9-13-77, Cl. D6-24.000.

Leljedahl, Trygve, to Trygve Liljedahl Skistavfabrikk A/S. Adjustable loop for a ski pole. 245,801, 9-13-77, Cl. D34-14.00D.

Lewis, Nathanial Henry. Combined bracket and supporting arm for holding balloons or the like. 245,755, 9-13-77, Cl. D8-349.000.

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Meeker, Paul K.; and Cone, Richard E. Pacifier. 245,790, 9-13-77, Cl. D24-45.000.

Minnesota Mining & Manufacturing Company: *See*—
Alseth, Gilmore N.; and Hipp, Richard D., Jr., 245,761, Cl. D9-224.000.

Monell, Charles M.: *See*—
Branch, Robert P.; and Monell, Charles M., 245,788, Cl. D24-26.000.

Murray Ohio Manufacturing Co., The: *See*—
Brightbill, Keith E., 245,770, Cl. D12-126.000.

Muth, Hans A., to Bayerische Motoren Werke Aktiengesellschaft. Spoke wheel. 245,775, 9-13-77, Cl. D12-205.000.

Myers, Earl D. Scale. 245,767, 9-13-77, Cl. D10-90.000.

Nakano, Minoru; and Tezuka, Toshiro, to Bridgestone Tire Company Limited. Vehicle tire. 245,771, 9-13-77, Cl. D12-146.000.

NCR Canada Ltd - NCR Canada Ltee: *See*—
Shawen, Harley J.; Haney, Ralph D.; and Kohli, Jerry L., 245,777, Cl. D14-44.000.

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Palka, James J. Door panel. 245,746, 9-13-77, Cl. D6-193.000.

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Pardo, John, to Proctor & Gamble Company, The. Bottle. 245,759, 9-13-77, Cl. D9-149.000.

Phillips, Harry: *See*—
Shea, John J.; and Phillips, Harry, 245,789, Cl. D24-28.000.

Plank, Duane. Toy whistle. 245,807, 9-13-77, Cl. D34-15.00C.

Pressmaster AB: *See*—
Wiener, Hans, 245,751, Cl. D8-52.000.
Wiener, Hans, 245,752, Cl. D8-52.000.

Price, Benjamin W. Peanut-shaped fishing lure. 245,785, 9-13-77, Cl. D22-28.000.

Procter & Gamble Company, The: *See*—
Pardo, John, 245,758, Cl. D9-67.000.

Proctor & Gamble Company, The: *See*—
Pardo, John, 245,759, Cl. D9-149.000.

Putt, Bernard J. Ski hanger. 245,741, 9-13-77, Cl. D6-85.000.

Rasmussen, Howard J., to Stewart-Warner Corporation. Speedometer. 245,768, 9-13-77, Cl. D10-98.000.

Rhodes, Charles R., to Shell Oil Company. Container for disseminating insecticidal or other vapors. 245,787, 9-13-77, Cl. D23-150.000.

Richardson-Merrell Inc.: *See*—
Takacs, Donald K., 245,762, Cl. D9-235.000.

Richter, Herbert, to Herbert Richter, Metallwaren-Apparatebau. Magnetically mounted support for cigarette lighter. 245,740, 9-13-77, Cl. D6-85.000.

Rogers Athletic Company: *See*—
Rogers, Orley David, 245,799, Cl. D34-5.00R.

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Roper Corporation: *See*—
Fisher, Gerald C.; and Scanland, Joseph E., 245,757, Cl. D8-391.000.

Ross, Barney F. Handbag. 245,814, 9-13-77, Cl. D87-3.00C.

Sandvik Aktiebolag: *See*—
Breger, Carl-Arne, 245,754, Cl. D8-96.000.

Scanland, Joseph E.: *See*—
Fisher, Gerald C.; and Scanland, Joseph E., 245,757, Cl. D8-391.000.

Scott & Fetzer Company, The: *See*—
McKee, Donald S., 245,756, Cl. D8-376.000.
Segura, Daniel A., to Great Plains Bag Corporation. Carrier bag. 245,763, 9-13-77, Cl. D9-249.000.
Sharp Kabushiki Kaisha: *See*—
Kitai, Isao, 245,809, Cl. D52-4.00A.
Yoshida, Yoshisaburo, 245,765, Cl. D10-15.000.
Shawen, Harley J.; Haney, Ralph D.; and Kohli, Jerry L., to NCR Canada Ltd - NCR Canada Ltee. Financial proof machine or similar article. 245,777, 9-13-77, Cl. D14-44.000.
Shea, John J.; and Phillips, Harry. Bone drill. 245,789, 9-13-77, Cl. D24-28.000.
Shell Oil Company: *See*—
Rhodes, Charles R., 245,787, Cl. D23-150.000.
Societe Anonyme Francaise du Ferodo: *See*—
Fieni, Walter, 245,783, Cl. D19-75.000.
Stacey, James H. Combined end-table and lamp pedestal. 245,808, 9-13-77, Cl. D48-20.00D.
Stewart-Warner Corporation: *See*—
Rasmussen, Howard J., 245,768, Cl. D10-98.000.
Sud Model Corporation: *See*—
Cook, Victor J., Jr., 245,739, Cl. D6-69.000.
Sullivan, Charles Wayne. Calculator support stand. 245,742, 9-13-77, Cl. D6-85.000.
Superscope, Inc.: *See*—
Dellar, Fred Jay, 245,776, Cl. D14-12.000.
Takacs, Donald K., to Richardson-Merrell Inc. Hinged display box. 245,762, 9-13-77, Cl. D9-235.000.
Tezuka, Toshiro: *See*—
Nakano, Minoru; and Tezuka, Toshiro, 245,771, Cl. D12-146.000.
Tokyo Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Chihara, Masao, 245,769, Cl. D11-13.000.
Tosoonian, Ronald. Medical corrective body brace. 245,812, 9-13-77, Cl. D24-64.000.
Trygve Liljedahl Skistavfabrikk A/S: *See*—
Leljedahl, Trygve, 245,801, Cl. D34-14.00D.
Wiener, Hans, to Pressmaster AB. Pair of crimping pliers. 245,751, 9-13-77, Cl. D8-52.000.
Wiener, Hans, to Pressmaster AB. Crimping pliers. 245,752, 9-13-77, Cl. D8-52.000.
Yoshida, Yoshisaburo, to Sharp Kabushiki Kaisha. Clock. 245,765, 9-13-77, Cl. D10-15.000.

CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 13, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

10	4,047,249
161 A	4,047,250
168	4,047,251

CLASS 3

1.4	4,047,252

CLASS 4

255	4,047,253

CLASS 5

345 R	4,047,254

CLASS 8

1 W	4,047,887
10.2	4,047,888
93	4,047,889

CLASS 9

337	4,047,255

CLASS 13

2 P	4,048,436

CLASS 14

1	4,047,256
27	4,047,257
71.3	4,047,258

CLASS 15

104.92	4,047,259
147 A	4,047,260
250.42	Re.29,392
261	4,047,261

CLASS 16

96 D	4,047,262
125	4,047,263

CLASS 23

230 A	4,047,891
230 B	4,047,890
232 C	4,047,892
254 E	4,047,893
284	4,047,894
288 F	4,047,895
314	4,047,896

CLASS 24

205.11 R	4,047,264
205.16 C	4,047,265
221 R	4,047,266
230 AL	4,047,267
274 R	4,047,268

CLASS 28

109	4,047,269
205	4,047,270
220	4,047,271

CLASS 29

2.19	4,047,272
116 AD	4,047,273
121.4	4,047,274
157.1 R	4,047,275
222	4,047,276
421 R	4,047,277
424	4,047,278
426	4,047,279
427	4,047,280
429	4,047,281
432	4,047,282
466	4,047,283
571	4,047,284
	4,047,285
578	4,047,286
600	4,047,287
604	4,047,288
623.4	4,047,289
625	4,047,290
628	4,047,291
630 R	4,047,292
736	4,047,293
749	4,047,294

CLASS 30

40.2	4,047,295
41	4,047,296
90.1	4,047,297
153	4,047,298
276	4,047,299
358	4,047,300

CLASS 32

27	4,047,301
32	4,047,302
40 R	4,047,303

CLASS 33

80	4,047,304
172 R	4,047,305
314	4,047,306

CLASS 35

28	4,047,307
29 R	4,047,308
60	4,047,309

CLASS 36

11.5	4,047,310

CLASS 37

54	4,047,311
141 R	4,047,312
187	4,047,313

CLASS 40

28 C	4,047,314
102	4,047,315

CLASS 43

7	4,047,316
42.06	4,047,317
42.24	4,047,318
44.87	4,047,319
55	4,047,320
78	4,047,321

CLASS 44

1 G	4,047,898
63	4,047,899
68	4,047,900

CLASS 46

1 R	4,047,322
47	4,047,323
86 R	4,047,324
106	4,047,325

CLASS 47

1.3	4,047,326
9	4,047,327
59	4,047,328
66	4,047,329

CLASS 48

86 R	4,047,901

CLASS 49

42	4,047,330
171	4,047,331
236	4,047,332
450	4,047,333

CLASS 51

106 R	4,047,338
295	4,047,902
298 R	4,047,903
313	4,047,343
422	4,047,334

CLASS 52

2	4,047,335
28	4,047,336
71	4,047,337
90	4,047,357
108	4,047,339
169.7	4,047,340
223 R	4,047,341
239	4,047,342
390	4,047,344
404	4,047,345
407	4,047,346
436	4,047,347
484	4,047,348
551	4,047,349
593	4,047,350
616	4,047,351
693	4,047,352
713	4,047,353
729	4,047,354
738	4,047,355
749	4,047,356

CLASS 53

30 R	4,047,358
64	4,047,359
122	4,047,360
189	4,047,362
212	4,047,361
371	4,047,363
389	4,047,364

CLASS 55

18	4,047,904
37	4,047,905
79	4,047,906
147	4,047,907
158	4,047,908
184	4,047,909
235	4,047,910
306	4,047,911
406	4,047,912
418	4,047,913
488	4,047,914

CLASS 56

27.5	4,047,365
63	4,047,366
202	4,047,367
	4,047,368
295	4,047,369
377	4,047,370

CLASS 57

34 R	4,047,371
	4,047,372
77.4	4,047,373
77.45	4,047,374

CLASS 58

21.13	4,047,375
23 D	4,047,376
152 B	4,047,377

CLASS 59

20	4,047,378

CLASS 60

39.09 D	4,047,379
39.46 R	4,047,380
226 A	4,047,381
252	4,047,382
354	4,047,383
372	4,047,384
641	4,047,385
654	4,047,386

CLASS 61

13	4,047,387
45 R	4,047,388
59	4,047,389
69 R	4,047,390
94	4,047,391

CLASS 62

402	4,047,392
428	4,047,393
502	4,047,394

CLASS 64

15 B	4,047,395
17 A	4,047,396

CLASS 65

106	4,047,915
	4,047,916
146	4,047,917
179	4,047,918
273	4,047,919
335	4,047,920

CLASS 66

118	4,047,397
132 R	4,047,398
149 R	4,047,399
171	4,047,400
187	4,047,401
195	4,047,402

CLASS 68

5 E	4,047,403
152	4,047,404
205 R	4,047,405

CLASS 70

25	4,047,406
52	4,047,407
129	4,047,408
356	4,047,409
401	4,047,410

CLASS 71

11	4,047,921
28	4,047,922
76	4,047,923
	4,047,924
78	4,047,925
86	4,047,926
	4,047,927
88	4,047,928
93	4,047,929
95	4,047,930
107	4,047,931
108	4,047,932

CLASS 72

7	4,047,411
58	4,047,412
83	4,047,413
91	4,047,414
125	4,047,415
183	4,047,416
185	4,047,417
278	4,047,418
370	4,047,419
416	4,047,420

CLASS 73

1 R	4,047,421
38	4,047,422
49.8	4,047,423
52	4,047,424
94	4,047,425
118	4,047,426
141 A	4,047,427
	4,047,428
150 R	4,047,429
151	4,047,430
170 R	4,047,431
194 C	4,047,433
194 VS	4,047,432
304 R	4,047,434
362 SC	4,047,435
	4,047,436
421.5 A	4,047,437
423 A	4,047,438
516 R	4,047,439

CLASS 74

6	4,047,440
52	4,047,441
194	4,047,442
199	4,047,443
229	4,047,444
230.4	4,047,445
234	4,047,446
409	4,047,447
417	4,047,448
458	4,047,449
552	4,047,450
665 H	4,047,451
752 C	4,047,452
813 R	4,047,453
868	4,047,454

CLASS 75

.5 C	4,047,933
29	4,047,934
34	4,047,935
52	4,047,936
59	4,047,937
67 A	4,047,938
99	4,047,939
108	4,047,940
126 B	4,047,941
133.5	4,047,942

CLASS 76

82.1	4,047,455

CLASS 81

57.38	4,047,456

CLASS 83

71	4,047,457
439	4,047,458

CLASS 84

390	4,047,459
422 S	4,047,460
458	4,047,461

CLASS 85

3 R	4,047,462
62	4,047,463

CLASS 89

1.811	4,047,464
8	4,047,465
14 R	4,047,466
41 H	4,047,467

CLASS 90

11 C	4,047,468
	4,047,469
15 R	4,047,470

CLASS 92

187	4,047,471

CLASS 93

36 A	4,047,474
36 B	4,047,473
93 D	4,047,472

CLASS 96

1 LY	4,047,943
1 R	4,047,945
	4,047,946
1 SD	4,047,950
1.2	4,047,944
1.3	4,047,947
1.5 R	4,047,948
	4,047,949
27 R	4,047,951
29 D	4,047,953
29 R	4,047,952
	4,047,954
	4,047,955
60 R	4,047,956
67	4,047,957
87 R	4,047,958
115 R	4,047,963
126	4,047,964

CLASS 98

116	4,047,475

CLASS 99

325	4,047,476
428	4,047,477
450.1	4,047,478

CLASS 101

36	4,047,479
123	4,047,480
376	4,047,481

CLASS 102

19.2	4,047,482
70.2 A	4,047,483
76 P	4,047,484
80	4,047,485

CLASS 104

9	4,047,486
173 ST	4,047,487

CLASS 105

315	4,047,488

CLASS 106

2	4,047,959
39.8	4,047,960
65	4,047,965
69	4,047,966
89	4,047,961
90	4,047,962
	4,047,967
281 R	4,047,968
291	4,047,969
299	4,047,970

CLASS 108

155	4,048,059

CLASS 110

15	4,047,489
56	4,047,490

CLASS 112

79 A	4,047,491

CLASS 114

39	4,047,492
102	4,047,493

CLASS 115

12 R	4,047,494

CLASS 118

49.1	4,047,496
50	4,047,497
243	4,047,498

CLASS 119

1	4,047,499
14.11	4,047,500
17	4,047,501
29	4,047,502
75	4,047,503
92	4,047,504
106	4,047,505

CLASS 122

32	4,047,506

CLASS 123

32 Ea	4,047,507
41.6	4,047,508
119 A	4,047,509
	4,047,510
122 E	4,047,512
122 G	4,047,511
148 E	4,047,513

CLASS 125

40	4,047,514

CLASS 126

110 R	4,047,515
270	4,047,516
	4,047,517
271	4,047,518
299 D	4,047,519

CLASS 128

2 V	4,047,520
2.08	4,047,521
66	4,047,522
69	4,047,523
	4,047,524
208	4,047,525
214 R	4,047,526
229	4,047,527
287	4,047,528
	4,047,529
	4,047,530
290 R	4,047,531
303 R	4,047,532
335.5	4,047,533
461	4,047,534

CLASS 131

23 R	4,047,535
140 C	4,047,536

CLASS 132

7	4,047,537

CLASS 133

4 R	4,047,538

CLASS 134

2	4,047,971
	4,047,972
10	4,047,973

CLASS 137

13	4,047,539
239	4,047,540
564.5	4,047,541
627.5	4,047,542

CLASS 138

155	4,047,543

CLASS 140

105	4,047,544
123.6	4,047,545

CLASS 141

1	4,047,547
1 R	4,047,546
52	4,047,548

CLASS 144

208 D	4,047,549

CLASS 148

1.5	4,047,974
	4,047,975
	4,047,976
6.2	4,047,977

11.5 C 4,047,978
12 R 4,047,979
12.7 C 4,047,980
16 4,047,981
101 4,047,982
105 4,047,983
152 4,047,984
153 4,047,985
171 4,047,986
175 Re.29,395

CLASS 149

19.2 4,047,990
37 4,047,987
74 4,047,988
109.6 4,047,989

CLASS 150

52 R 4,047,550

CLASS 152

354 4,047,551
361 R 4,047,552

CLASS 156

62.6 4,047,991
73.1 4,047,992
89 4,047,993
98 4,047,994
203 4,047,995
220 4,047,996
229 4,047,997
275 4,047,998
280 4,047,999
304 4,048,000
331 4,048,001
403 4,048,002
515 4,048,003
580.1 4,048,004
630 4,048,005
664 4,048,006

CLASS 157

1.24 4,047,553

CLASS 160

168 R 4,047,554

CLASS 162

57 4,048,007
104 4,048,008

CLASS 164

52 4,047,555
57 4,047,556
252 4,047,557
309 4,047,558

CLASS 165

7 4,047,559
9.3 4,047,560
32 4,047,561
111 4,047,562
158 4,047,563

CLASS 166

72 4,047,564
217 4,047,565
285 4,047,566
293 4,047,567
298 4,047,568
308 4,047,569

CLASS 169

16 4,047,570
60 4,047,571
62 4,047,572

CLASS 171

14 4,047,573

CLASS 172

178 4,047,574
311 4,047,575
540 4,047,576
730 4,047,577

CLASS 173

152 4,047,578

CLASS 174

15 S 4,048,437
68.5 4,048,438

CLASS 175

7 4,047,579
67 4,047,580
95 4,047,581
122 4,047,582
410 4,047,583

CLASS 176

19 R 4,048,009
36 R 4,048,010
40 4,048,011
60 4,048,012

CLASS 177

1 4,047,584
210 R 4,047,585
4,047,586

CLASS 178

17 C 4,048,439
69.1 4,048,440
73 4,048,441

CLASS 179

1 GP 4,048,442
1 SA 4,048,443
1 ST 4,048,444
15 AL 4,048,446
15 AS 4,048,447
15 BF 4,048,445
17 E 4,048,448
18 AH 4,048,451
18 BC 4,048,449
18 EB 4,048,450
27 D 4,048,452
110 A 4,048,454
156 R 4,048,453

CLASS 180

53 R 4,047,587
64 R 4,047,588
108 4,047,589
139 4,047,590
141 4,047,728

CLASS 181

119 4,047,591
142 4,047,592

CLASS 182

2 4,047,593
153 4,047,594

CLASS 184

6.14 4,047,595

CLASS 187

29 R 4,047,596
95 4,047,597

CLASS 188

71.1 4,047,598

CLASS 191

12.2 A 4,047,599
29 R 4,047,600

CLASS 192

36 4,047,601
53 F 4,047,602
64 4,047,603

CLASS 193

10 4,047,604

CLASS 194

1 R 4,047,605

CLASS 195

49 4,048,013
66 B 4,048,014
96 4,048,015
100 4,048,016
109 4,048,017
115 4,048,018
129 4,048,019

CLASS 196

132 4,048,020

CLASS 197

1 R 4,047,606
151 4,047,607
4,047,608

CLASS 198

690 4,047,609

CLASS 200

81.4 4,048,455
148 A 4,048,456
150 R 4,048,457

CLASS 203

91 4,048,021

CLASS 204

1 T 4,048,022
44 4,048,023
55 R 4,048,024
56 R 4,048,025
61 4,048,026
4,048,027
97 4,048,028
129 4,048,029
149 4,048,030
4,048,031
151 4,048,032
158 HA 4,048,033
159.15 4,048,035
159.23 4,048,034
4,048,036
180 R 4,048,037
4,048,038
192 P 4,048,039
195 R 4,048,040
4,048,041
206 4,048,042
224 R 4,048,043
257 4,048,044
263 4,048,045
266 4,048,046
270 4,048,047
279 4,048,048
281 Re.29,396
299 R 4,048,049

CLASS 206

1.5 4,048,050
4,048,051
187 4,047,610
347 4,047,611
454 4,047,612
620 4,047,660
625 4,048,052

CLASS 208

8 4,048,053
4,048,054
25 4,048,055
41 4,048,056
89 4,048,057
138 4,048,058
210 4,048,060
251 R 4,048,061
321 4,048,062

CLASS 209

74 M 4,047,613

CLASS 210

23 R 4,048,064
58 4,048,065
4,048,066
72 4,048,063
73 R 4,048,067
80 4,048,068
84 4,048,069
85 4,048,070
90 4,048,071
220 4,048,072
284 4,048,073
316 Re.29,397
323 T 4,048,074
484 4,048,075
528 4,048,076

CLASS 211

20 4,047,614
88 4,047,615
183 4,047,616

CLASS 212

39 MS 4,047,617
58 R 4,047,618

CLASS 213

166 4,047,619

CLASS 214

1 C 4,047,620
6 DS 4,047,621
8.5 A 4,047,622
17 B 4,047,624
17 C 4,047,623
95 R 4,047,625
147 G 4,047,626
152 4,047,627
4,047,628
451 4,047,629
506 4,047,630
519 4,047,631

CLASS 215

224 4,047,495

CLASS 219

10.79 4,048,458
69 G Re.29,398
Re.29,399
85 BM 4,048,459
91 4,048,460
104 4,048,461
118 4,048,463
121 EB 4,048,462
121 EM 4,048,466
121 LM 4,048,464
121 R 4,048,465
131 R 4,048,467
135 Re.29,400
4,048,468
203 4,048,469
216 4,048,470
228 4,048,471
388 4,048,472
389 4,048,473

CLASS 220

3 4,047,632
9 R 4,047,633
270 4,047,634

CLASS 221

5 4,047,635
161 4,047,636
211 Re.29,393
265 4,047,637
266 4,047,638

CLASS 222

64 4,047,639
4,047,640
80 4,047,641
94 4,047,642
153 4,047,643
193 4,047,644
386.5 4,047,645
402.13 4,047,646
480 4,047,647
498 4,047,648

CLASS 223

43 4,047,649

CLASS 224

2 B 4,047,650
4 D 4,047,651

CLASS 225

54 4,047,652

CLASS 226

92 4,047,653

CLASS 227

19 4,047,654

CLASS 228

27 4,047,656
103 4,047,657
115 4,047,658
119 4,047,659
259 4,047,655

CLASS 229

70 4,047,661

CLASS 235

61.11 D 4,048,476
61.7 B 4,048,475
88 R 4,048,477
92 T 4,048,478
150.21 4,048,479
151.34 4,048,474
152 4,048,480
153 A 4,048,483
153 AE 4,048,482
153 AK 4,048,481
156 4,048,484
4,048,485

CLASS 236

49 4,047,662

CLASS 238

304 4,047,663

CLASS 239

120 4,047,664
124 4,047,665
251 4,047,666
265.35 4,047,667
500 4,047,668
540 4,047,669

CLASS 240

1 R 4,048,486
1.3 4,048,487
4,048,488
6.41 4,048,489
41.35 D 4,048,490
78 H 4,048,491

CLASS 241

66 4,047,671
92 4,047,670
175 4,047,672
186 R 4,047,673

CLASS 242

18 DD 4,047,674
47.01 4,047,675
66 4,047,676

CLASS 243

19 4,047,677

CLASS 244

3.16 4,047,678
16 4,047,679
87 4,047,680
102 SS 4,047,681
110 B 4,047,682

CLASS 248

62 4,047,683
122 4,047,684
158 4,047,685
203 4,047,686
318 4,047,687
451 4,047,688
503.1 4,047,689

CLASS 249

66 A 4,047,690
97 4,047,691
142 4,047,692
187 R 4,047,693

CLASS 250

201 4,048,492
205 4,048,493
223 R 4,048,494
264 4,048,495
272 4,048,496
303 4,048,497
305 4,048,498
344 4,048,499
350 4,048,500
367 4,048,501
370 4,048,502
385 4,048,503
434 4,048,504
445 T 4,048,505
479 4,048,506
491 4,048,507
492 A 4,048,508
522 4,048,509
563 4,048,510

CLASS 251

6 4,047,694
122 4,047,695
308 4,047,696
328 4,047,697

CLASS 252

8.5 C 4,048,077
8.55 D 4,048,078
4,048,079
51.5 A 4,048,082
51.5 R 4,048,081
51.54 4,048,080
78.3 4,048,083
4,048,084
102 4,048,085
182 4,048,086
188 4,048,087
299 4,048,088
4,048,089
301.1 R 4,048,090
373 4,048,091
412 4,048,092
414 4,048,093
4,048,094
429 R 4,048,095
430 4,048,096
431 N 4,048,097
432 4,048,098
441 4,048,099
442 4,048,108
4,048,109
443 4,048,110
455 Z 4,048,111
461 4,048,112
462 4,048,113
463 4,048,114
465 4,048,115
470 4,048,116
513 4,048,117
518 4,048,118
521 4,048,119
522 4,048,120
527 4,048,121
541 4,048,122
545 4,048,123

CLASS 254

2 R 4,047,698
86 H 4,047,699
89 H 4,047,700

CLASS 256

13.1 4,047,701
4,047,702
68 4,047,703

CLASS 259

1 R 4,047,704
192 4,047,705

CLASS 260

2.5 AC 4,048,105
4,048,107
2.5 AJ 4,048,100
2.5 AM 4,048,102
2.5 AN 4,048,104
2.5 AV 4,048,106
2.5 B 4,048,103
2.5 E 4,048,101
5 4,048,124
7 4,048,125
17.2 4,048,126
4,048,127
22 R 4,048,128
23 H 4,048,129
29.4 R 4,048,179
29.6 NR 4,048,130
33.2 R 4,048,131
33.4 R 4,048,192
33.6 UA 4,048,132
37 PC 4,048,133
38 4,048,134
40 R 4,048,135
42.14 4,048,136
42.15 4,048,137
42.37 4,048,138
45.8 N 4,048,139
45.95 C 4,048,140
47 CP 4,048,142
4,048,144
47 EC 4,048,141
47 ET 4,048,143
57 R 4,048,145
63 UY 4,048,146
67 UA 4,048,147
72.5 4,048,148
75 S 4,048,149
75 T 4,048,150
156 4,048,151
176 4,048,152
193 4,048,153
205 4,048,154
239 A 4,048,156
4,048,157
239.1 4,048,158
239.55 R 4,048,159
251 QB 4,048,168
251 R 4,048,169
256.4 C 4,048,171
256.4 E 4,048,170
256.5 R 4,048,172
272 4,048,173
283 S 4,048,175
283 SY 4,048,174
286 R 4,048,176
288 R 4,048,177
293.54 4,048,178
294.8 G 4,048,181
295.5 B 4,048,182
296 H 4,048,184
296 R 4,048,183
297 R 4,048,180
307 D 4,048,185
307 FA 4,048,186
308 D 4,048,187
314.5 4,048,189
326 N 4,048,190
326.47 4,048,191
343.3 R 4,048,193
343.6 4,048,194
345.9 S 4,048,195
346.11 4,048,196
346.3 4,048,197
347.4 4,048,198
380 4,048,199
395 4,048,200
410 4,048,201
410.6 4,048,202
412.8 4,048,203
413 4,048,204
428 4,048,205
448.8 R 4,048,206
4,048,207
464 4,048,209
465 E 4,048,211
465 F 4,048,210
4,048,213
465 H 4,048,212
465.3 4,048,216
512 C 4,048,221
514 J 4,048,222
534 C 4,048,224
536 4,048,225
556 AR 4,048,223
561 N 4,048,226
562 P 4,048,227
566 R 4,048,228
570.5 C 4,048,230
570.6 4,048,229
570.7 4,048,231
601 R 4,048,232
604 HF 4,048,233
607 AR 4,048,234
612 R 4,048,235
613 D 4,048,236
615 B 4,048,237
618 R 4,048,238
624 C 4,048,239
652 P 4,048,240
658 R 4,048,241
666 A 4,048,242
668 D 4,048,243
4,048,244
4,048,245
4,048,246
671 P 4,048,247
4,048,248
673.5 4,048,249
683.43 4,048,250
683.68 4,048,251
850 4,048,252
858 4,048,253

859 R 4,048,254
4,048,255
860 4,048,256
862 4,048,257
879 4,048,258
881 4,048,259
884 4,048,260
888 4,048,261
889 4,048,262
890 4,048,263
929 4,048,264

CLASS 261

111 4,048,265
122 4,048,266
4,048,267

CLASS 264

15 4,048,268
25 4,048,269
34 4,048,270
41 4,048,271
45.3 4,048,208
4,048,272
46.5 4,048,273
4,048,274
54 4,048,275
79 4,048,276
83 4,048,277
102 4,048,280
135 4,048,278
184 4,048,279
230 4,048,281

CLASS 266

49 4,047,706
222 4,047,707
243 4,047,708

CLASS 269

22 4,047,709
42 4,047,710

CLASS 270

86 4,047,711

CLASS 271

64 4,047,712
221 4,047,713

CLASS 272

116 4,047,714
132 4,047,715

CLASS 273

1 R 4,047,716
95 H 4,047,717
98 4,047,718
130 R 4,047,719
4,047,720

CLASS 274

9 A 4,047,721

CLASS 277

229 Re.29,394

CLASS 279

19.5 4,047,722
121 4,047,723

CLASS 280

5.22 4,047,724
11.28 4,047,725
11.37 A 4,047,726
87.04 A 4,047,727
267 4,047,729
281 B 4,047,731
281 LP 4,047,730
287 4,047,732
402 4,047,733
486 4,047,734
610 4,047,735
683 4,047,736
745 4,047,737

CLASS 282

27.5 4,047,738

CLASS 285

21 4,047,739
47 4,047,740
55 4,047,741
187 4,047,742
340 4,047,743

CLASS 290

1 R 4,048,511
53 4,048,512

CLASS 292

171 4,047,744
302 4,047,745

CLASS 294

55 4,047,746

CLASS 296

1 S 4,047,747
35 A 4,047,748
39 R 4,047,749
107 4,047,750
146 4,047,751

CLASS 297

19 4,047,752
32 4,047,753
157 4,047,754
216 4,047,755
219 4,047,756
230 4,047,757
284 4,047,758
346 4,047,759

CLASS 299

2 4,047,760
64 4,047,761
4,047,762
76 4,047,763

CLASS 301

6 V 4,047,764

CLASS 303

24 F 4,047,765
97 4,047,766

CLASS 307

28 4,048,513
88.3 4,048,514
4,048,515
4,048,516
213 4,048,517
214 4,048,518
221 D 4,048,519
252 Q 4,048,520
291 4,048,521
293 4,048,522
297 4,048,523
304 4,048,524
353 4,048,525

CLASS 308

3.6 4,047,767
72 4,047,768
121 4,047,769
191 4,047,770
237 R 4,047,771
4,047,772

CLASS 310

43 4,048,527
49 R 4,048,531
54 4,048,528
4,048,529
68 D 4,048,532
89 4,048,530
329 4,048,526

CLASS 312

111 4,047,773
211 4,047,775
231 4,047,774
245 4,047,776
263 4,047,777

CLASS 313

188 4,048,533
293 4,048,534
367 4,048,535
403 4,048,536
489 4,048,537
519 4,048,538

CLASS 315

39.71 4,048,542
176 4,048,539
205 4,048,543
241 P 4,048,540
248 4,048,541
408 4,048,544

CLASS 316

2 4,048,545
18 4,047,778

CLASS 318

138 4,048,548
345 F 4,048,549
356 4,048,550
488 4,048,547

CLASS 320

21 4,048,551

CLASS 324

.5 MA 4,048,555
40 4,048,556
46 4,048,557
57 R 4,048,558
57 SS 4,048,559
115 4,048,560

CLASS 325

22 4,048,561
31 4,048,562
58 4,048,563
67 4,048,564
114 4,048,565
329 4,048,566
363 4,048,567
4,048,568
414 4,048,569
459 4,048,570

CLASS 328

20 4,048,571

CLASS 329

104 4,048,572

CLASS 330

2 4,048,573
9 4,048,574
22 4,048,575
29 4,048,576
30 D 4,048,577
31 4,048,578
151 4,048,579

CLASS 331

1 A 4,048,581
1 R 4,048,580
16 4,048,582
56 4,048,583
62 4,048,584
94.5 C 4,048,585
94.5 D 4,048,586
94.5 G 4,048,587
96 4,048,588
107 R 4,048,589
116 R 4,048,590

CLASS 332

7.51 4,048,591

CLASS 333

6 4,048,592
70 R 4,048,593
72 4,048,594
4,048,595

CLASS 334

8 4,048,596
15 4,048,597
4,048,598

CLASS 335

20 4,048,599
128 4,048,600
193 4,048,601
222 4,048,602

CLASS 336

25 4,048,552
57 4,048,603
83 4,048,604
176 4,048,605
198 4,048,606

CLASS 337

53 4,048,607
74 4,048,608
159 4,048,609
165 4,048,610
380 4,048,611

CLASS 339

9 A 4,047,779
17 CF 4,047,780
17 R 4,047,781
75 MP 4,047,782
97 R 4,047,783
98 4,047,784
99 R 4,047,785
154 A 4,047,786
4,047,787
177 R 4,047,788
198 H 4,047,789
220 C 4,047,790
260 4,047,791

CLASS 340

15.5 CP 4,048,612
53 4,048,613
58 4,048,614
146.3 AC 4,048,615
146.3 E 4,048,618
146.3 ED 4,048,616
146.3 SY 4,048,617
154 4,048,619
163 4,048,620
168 B 4,048,621
173 CA 4,048,629
173 LM 4,048,628
173 R 4,048,626
274 R 4,048,630
321 4,048,631
324 M 4,048,633
324 R 4,048,632
337 4,048,634
347 DA 4,048,635

CLASS 343

6.5 LC 4,048,636
7.7 4,048,637
8 Re.29,401
894 4,048,638

CLASS 346

75 4,048,639
140 A 4,048,640

CLASS 350

6 4,047,792
7 4,047,793
54 4,047,794
96 C 4,047,795
4,047,796
4,047,797
96 WG 4,047,801
97 4,047,798
4,047,799
4,047,802
99 4,047,800
160 LC 4,047,803
164 4,047,804
166 4,047,805
236 4,047,806
266 4,047,807
271 4,047,808

CLASS 351

118 4,047,809

CLASS 354

10 4,048,641
23 D 4,048,642
51 4,048,643
60 L 4,048,644
300 4,048,645

CLASS 355

3 R 4,047,810
14 4,047,811
76 4,047,812
95 4,047,813

CLASS 356

38 4,047,814
104 4,047,815
152 4,047,816
175 4,047,817
189 4,047,818
205 4,047,819
244 4,047,820

CLASS 357

15 4,048,646
17 4,048,627
22 4,048,647
27 4,048,648
43 4,048,649

CLASS 358

1 4,048,650
8 4,048,651
28 4,048,652
104 4,048,653
144 4,048,654
148 4,048,655
174 4,048,656
285 4,048,657

CLASS 360

9 4,048,658
72 4,048,659
77 4,048,660
130 4,048,661

CLASS 361

31 4,048,662
75 4,048,663
89 4,048,664
152 4,048,665
189 4,048,666
213 4,048,667
235 4,048,668
321 4,048,546
391 4,048,669
421 4,048,670

CLASS 363

57 4,048,553
98 4,048,554

CLASS 364

200 4,048,624
4,048,671
4,048,672
4,048,673
900 4,048,622
4,048,623
4,048,625

CLASS 403

109 4,047,821
187 4,047,822
188 4,047,823
209 4,047,824

CLASS 404

70 4,047,825

CLASS 408

59 4,047,826
76 4,047,827
145 4,047,828
169 4,047,829
239 A 4,047,830

CLASS 415

1 4,047,831
4,047,832
2 4,047,833
3 4,047,834

CLASS 416

23 4,047,835
39 4,047,836
95 4,047,837
115 4,047,838
134 A 4,047,839
135 4,047,840
140 4,047,841
152 4,047,842
185 4,047,843

CLASS 417

3 4,047,844
251 4,047,845
300 4,047,846
370 4,047,847
374 4,047,848
383 4,047,850
384 4,047,849
412 4,047,851
415 4,047,852
434 4,047,853
489 4,047,854

CLASS 418

53 4,047,855
61 A 4,047,856
153 4,047,857
201 4,047,858
232 4,047,859

CLASS 423

24 4,048,282
92 4,048,283
112 4,048,284
132 4,048,285
242 4,048,286
4,048,287
267 4,048,288
317 4,048,289
336 4,048,290
387 4,048,291
415 A 4,048,292
574 L 4,048,293
618 4,048,294
626 4,048,295

CLASS 424

1 4,048,296
4,048,297
1.5 4,048,298
49 4,048,299
52 4,048,300
70 4,048,301
78 4,048,302
94 4,048,303
122 4,048,304
177 4,048,305
180 4,048,306
4,048,307
195 4,048,308
238 4,048,309
4,048,310
246 4,048,311
248.5 4,048,313
248.55 4,048,314
248.56 4,048,312
249 4,048,315
251 4,048,316
267 4,048,317
269 4,048,318
4,048,319
271 4,048,320
274 4,048,321
283 4,048,322
285 4,048,323
294 4,048,324
298 4,048,325
300 4,048,326
305 4,048,327
4,048,328
4,048,329
308 4,048,330
317 4,048,331
4,048,332
322 4,048,333
325 4,048,334
329 4,048,335
334 4,048,336
357 4,048,337
358 4,048,338

CLASS 425

4 R 4,047,860
7 4,047,861
8 4,047,862
13 4,047,863
78 4,047,864
80 4,047,865
107 4,047,866
117 4,047,867
133.1 4,047,868
143 4,047,869
151 4,047,870
450.1 4,047,871
469 4,047,872
523 4,047,873
4,047,874

CLASS 426

39 4,048,339
46 4,048,340
69 4,048,341
129 4,048,342
330.2 4,048,343
385 4,048,344
432 4,048,345
583 4,048,346

CLASS 427

10 4,048,347
34 4,048,348
58 4,048,349
93 4,048,350
213 4,048,351
234 4,048,352
291 4,048,353
304 4,048,354
375 4,048,355
379 4,048,356
387 4,048,357

CLASS 428

1 4,048,358
4,048,359
35 4,048,360
4,048,361
36 4,048,362
77 4,048,363
113 4,048,364
215 4,048,365
4,048,366
220 4,048,367
235 4,048,368
262 4,048,369
323 4,048,370
375 4,048,371
412 4,048,372
454 4,048,373
457 4,048,374
461 4,048,376
474 4,048,375
4,048,377
483 4,048,378
500 4,048,379
511 4,048,380
539.5 4,047,897
632 4,048,381
651 4,048,382

CLASS 429

19 4,048,383
22 4,048,384
34 4,048,385
38 4,048,386
50 4,048,387
91 4,048,388
101 4,048,389
102 4,048,390
104 4,048,391
4,048,393
4,048,394
105 4,048,392
112 4,048,395
116 4,048,396
131 4,048,397
140 4,048,398
141 4,048,399
160 4,048,400
171 4,048,401
194 4,048,402
4,048,403
199 4,048,404
206 4,048,405
209 4,048,406
217 4,048,407
229 4,048,408

CLASS 431

3 4,047,875
7 4,047,876
8 4,047,877
22 4,047,878
183 4,047,879
208 4,047,880
215 4,047,881

CLASS 432

9 4,047,882
14 4,047,883

CLASSIFICATION OF PATENTS

21	4,047,884
60	4,047,885
128	4,047,886
CLASS 526	
5	4,048,409
9	4,048,416
22	4,048,410
62	4,048,417
64	4,048,411
65	4,048,412
66	4,048,413
106	4,048,414
119	4,048,415
138	4,048,418
153	4,048,419
173	4,048,420
177	4,048,421
203	4,048,422
209	4,048,423
237	4,048,424
245	4,048,425
334	4,048,426
337	4,048,427
343	4,048,428
CLASS 528	
497	4,048,429
CLASS 536	
17	4,048,430
	4,048,431
26	4,048,432
99	4,048,433
105	4,048,434
106	4,048,435
CLASS 542	
422	4,048,155
CLASS 544	
21	4,048,160
	4,048,163
22	4,048,162
27	4,048,161
121	4,048,164
166	4,048,165
215	4,048,166
	4,048,167
CLASS 548	
341	4,048,188
CLASS 560	
20	4,048,217
124	4,048,215
128	4,048,214
147	4,048,218
156	4,048,219
237	4,048,220

CLASSIFICATION OF DESIGNS

D2—	27	245,731
	310	245,732
		245,733
	320	245,734
		245,735
		245,736
	400	245,737
D6—	24	245,738
	69	245,739
	85	245,740
		245,741
		245,742
	95	245,743
	186	245,744
	193	245,745
		245,746
	201	245,747
	252	245,748
	257	245,749
D7—	47	245,750
D8—	52	245,751
		245,752
	72	245,753
	96	245,754
	349	245,755
	376	245,756
	391	245,757
D9—	67	245,758
	149	245,759
	177	245,760
	224	245,761
	235	245,762
	249	245,763
D10—	9	245,764
	15	245,765
	38	245,766
	90	245,767
	98	245,768
D11—	13	245,769
D12—	126	245,770
	146	245,771
	155	245,772
		245,773
	169	245,774
	205	245,775
D14—	12	245,776
	44	245,777
	86	245,778
D15—	9	245,779
	32	245,780
D16—	65	245,781
D19—	1	245,782
	75	245,783
D22—	25	245,784
	28	245,785
D23—	3	245,786
	150	245,787
D24—	21	245,811
	26	245,788
	28	245,789
	45	245,790
	64	245,812
D25—	74	245,791
	77	245,792
D30—	2	245,793
		245,794
		245,795
	33	245,796
D34—	5 GS	245,797
	5 NN	245,798
	5 R	245,799
	14 B	245,800
	14 D	245,801
	15 B	245,802
		245,803
		245,804
		245,805
		245,806
	15 C	245,807
D48—	20 D	245,808
D52—	4 A	245,809
D64—	11 B	245,810
D87—	1 R	245,813
	3 C	245,814
	5 F	245,815

CLASSIFICATION OF PLANTS

P.—	68	4,101
		4,102
		4,103
	74	4,104
	76	4,105

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 4,047,318
4,047,483
4,048,368
4,048,568
4 : 4,047,475
4,047,485
4,047,589
4,047,626
4,047,976
4,048,203
4,048,566
4,048,575
4,048,626
4,048,629
5 : 4,047,515
4,047,744
6 : Re.29,392
4,047,249
4,047,250
4,047,253
4,047,255
4,047,284
4,047,285
4,047,302
4,047,308
4,047,310
4,047,331
4,047,333
4,047,347
4,047,352
4,047,382
4,047,388
4,047,389
4,047,409
4,047,410
4,047,437
4,047,440
4,047,447
4,047,458
4,047,461
4,047,477
4,047,489
4,047,495
4,047,496
4,047,527
4,047,532
4,047,540
4,047,544
4,047,550
4,047,557
4,047,573
4,047,581
4,047,623

4,047,624
4,047,627
4,047,635
4,047,650
4,047,663
4,047,668
4,047,688
4,047,694
4,047,703
4,047,724
4,047,727
4,047,739
4,047,757
4,047,758
4,047,768
4,047,792
4,047,795
4,047,797
4,047,819
4,047,844
4,047,869
4,047,912
4,047,974
4,047,990
4,048,007
4,048,016
4,048,040
4,048,049
4,048,050
4,048,051
4,048,122
4,048,123
4,048,204
4,048,270
4,048,271
4,048,325
4,048,330
4,048,343
4,048,365
4,048,395
4,048,454
4,048,462
4,048,473
4,048,489
4,048,491
4,048,496
4,048,499
4,048,500
4,048,507
4,048,516
4,048,518
4,048,524
4,048,534

4,048,557
4,048,558
4,048,560
4,048,565
4,048,567
4,048,576
4,048,577
4,048,586
4,048,588
4,048,593
4,048,594
4,048,601
4,048,628
4,048,632
4,048,645
4,048,651
4,048,668
8 : 4,047,517
4,047,699
4,047,760
4,047,778
4,047,835
4,048,073
4,048,137
4,048,138
4,048,298
4,048,369
4,048,612
4,048,660
9 : 4,047,395
4,047,397
4,047,453
4,047,492
4,047,585
4,047,586
4,047,607
4,047,608
4,047,657
4,047,689
4,047,798
4,047,834
4,047,838
4,047,839
4,047,859
4,047,891
4,047,978
4,047,980
4,048,065
4,048,083
4,048,084
4,048,095
4,048,107
4,048,226

4,048,256
4,048,294
4,048,304
4,048,351
4,048,370
4,048,372
4,048,530
4,048,614
4,048,659
01 : 4,047,678
10 : 4,047,480
4,047,963
4,048,096
4,048,128
4,048,156
4,048,279
4,048,546
12 : 4,047,260
4,047,282
4,047,304
4,047,328
4,047,345
4,047,346
4,047,423
4,047,631
4,047,651
4,047,658
4,047,714
4,047,747
4,047,784
4,048,145
4,048,220
4,048,284
4,048,302
4,048,477
4,048,506
4,048,562
13 : 4,047,261
4,047,349
4,047,610
4,047,686
4,048,038
16 : 4,048,618
17 : Re.29,396
4,047,277
4,047,294
4,047,297
4,047,311
4,047,312
4,047,356
4,047,383
4,047,416
4,047,427

4,047,434
4,047,479
4,047,499
4,047,528
4,047,529
4,047,530
4,047,531
4,047,542
4,047,572
4,047,614
4,047,619
4,047,620
4,047,639
4,047,640
4,047,647
4,047,664
4,047,665
4,047,676
4,047,692
4,047,711
4,047,730
4,047,740
4,047,746
4,047,771
4,047,772
4,047,777
4,047,779
4,047,855
4,047,861
4,047,870
4,047,895
4,047,908
4,047,951
4,047,984
4,047,996
4,048,034
4,048,059
4,048,062
4,048,066
4,048,097
4,048,099
4,048,108
4,048,109
4,048,111
4,048,115
4,048,126
4,048,127
4,048,131
4,048,202
4,048,205
4,048,228
4,048,244
4,048,245

4,048,246
4,048,247
4,048,248
4,048,249
4,048,267
4,048,373
4,048,452
4,048,458
4,048,459
4,048,464
4,048,589
4,048,605
4,048,652
4,048,654
4,048,655
4,048,657
4,048,669
18 : 4,047,370
4,047,412
4,047,452
4,047,454
4,047,488
4,047,575
4,047,593
4,047,601
4,047,604
4,047,638
4,047,656
4,047,708
4,047,745
4,047,767
4,047,823
4,047,866
4,047,878
4,048,058
4,048,075
4,048,094
4,048,144
4,048,157
4,048,160
4,048,161
4,048,162
4,048,163
4,048,211
4,048,268
4,048,299
4,048,312
4,048,490
19 : 4,047,343
4,047,425
4,047,431
4,047,465
4,047,587

4,048,434
4,048,556
20 : Re.29,401
21 : 4,047,476
4,048,207
22 : 4,047,320
4,047,574
4,047,754
4,047,962
4,048,060
4,048,064
24 : 4,047,339
4,047,377
4,047,457
4,047,490
4,047,522
4,047,820
4,048,022
4,048,076
4,048,092
4,048,218
4,048,219
4,048,474
4,048,513
4,048,520
4,048,563
4,048,595
4,048,608
4,048,636
4,048,637
25 : 4,047,281
4,047,287
4,047,289
4,047,329
4,047,332
4,047,379
4,047,415
4,047,462
4,047,498
4,047,504
4,047,523
4,047,524
4,047,545
4,047,653
4,047,719
4,047,780
4,047,814
4,047,849
4,047,858
4,047,876
4,047,940
4,047,950
4,047,954
4,047,955
4,048,048
4,048,125
4,048,141
4,048,166
4,048,167
4,048,263
4,048,269
4,048,274
4,048,290
4,048,347
4,048,401
4,048,404
4,048,428
4,048,481
4,048,501
4,048,537
4,048,559
4,048,580
4,048,596
4,048,609
4,048,610
4,048,620
4,048,623
4,048,673
26 : 4,047,263
4,047,334
4,047,341
4,047,396
4,047,433
4,047,512
4,047,628
4,047,633
4,047,696
4,047,723
4,047,732
4,047,749
4,047,773
4,047,825
4,047,827
4,047,852
4,047,864

4,047,902
4,048,000
4,048,002
4,048,006
4,048,068
4,048,087
4,048,193
4,048,194
4,048,213
4,048,237
4,048,288
4,048,297
4,048,331
4,048,335
4,048,382
4,048,393
4,048,394
4,048,410
4,048,432
4,048,484
4,048,561
27 : 4,047,367
4,047,445
4,047,460
4,047,518
4,047,553
4,047,588
4,047,629
4,047,637
4,047,706
4,047,856
4,047,965
4,048,052
4,048,103
4,048,121
4,048,323
4,048,498
4,048,526
4,048,536
28 : 4,047,326
4,047,577
29 : 4,047,279
4,047,293
4,047,336
4,047,446
4,047,661
4,047,821
4,047,875
4,047,926
4,047,927
4,048,264
4,048,265
4,048,296
4,048,564
30 : 4,047,710
31 : 4,047,611
33 : 4,047,413
4,047,804
4,048,105
34 : Re.29,394
4,047,252
4,047,307
4,047,309
4,047,317
4,047,319
4,047,335
4,047,358
4,047,417
4,047,432
4,047,466
4,047,484
4,047,491
4,047,493
4,047,513
4,047,613
4,047,677
4,047,720
4,047,731
4,047,738
4,047,781
4,047,800
4,047,842
4,047,845
4,047,873
4,047,877
4,047,880
4,047,890
4,047,914
4,047,925
4,047,956
4,047,986
4,048,001
4,048,023
4,048,043
4,048,053

4,048,054
4,048,082
4,048,110
4,048,139
4,048,179
4,048,181
4,048,195
4,048,201
4,048,224
4,048,231
4,048,250
4,048,251
4,048,258
4,048,277
4,048,309
4,048,310
4,048,316
4,048,338
4,048,342
4,048,354
4,048,371
4,048,425
4,048,435
4,048,440
4,048,441
4,048,443
4,048,444
4,048,448
4,048,451
4,048,453
4,048,456
4,048,465
4,048,531
4,048,551
4,048,552
4,048,597
4,048,598
4,048,606
4,048,607
4,048,611
4,048,627
4,048,638
4,048,641
36 : 4,047,257
4,047,259
4,047,292
4,047,303
4,047,315
4,047,357
4,047,363
4,047,424
4,047,444
4,047,451
4,047,533
4,047,538
4,047,561
4,047,570
4,047,584
4,047,645
4,047,717
4,047,718
4,047,743
4,047,755
4,047,776
4,047,783
4,047,786
4,047,794
4,047,799
4,047,802
4,047,810
4,047,811
4,047,812
4,047,832
4,047,833
4,047,874
4,047,885
4,047,898
4,047,899
4,047,900
4,047,905
4,047,910
4,047,933
4,047,938
4,047,941
4,047,943
4,047,944
4,047,945
4,047,947
4,047,948
4,047,949
4,047,960
4,047,966
4,047,969
4,047,973
4,047,992

4,048,004
4,048,028
4,048,042
4,048,046
4,048,080
4,048,093
4,048,142
4,048,143
4,048,146
4,048,176
4,048,190
4,048,239
4,048,336
4,048,345
4,048,356
4,048,361
4,048,390
4,048,423
4,048,431
4,048,515
4,048,525
4,048,529
4,048,539
4,048,541
4,048,550
4,048,571
4,048,573
4,048,590
4,048,603
4,048,621
4,048,631
4,048,639
4,048,671
4,048,672
37 : 4,047,272
4,047,365
4,047,400
4,047,405
4,047,502
4,047,649
4,047,862
4,048,178
4,048,460
4,048,463
4,048,543
4,048,648
38 : 4,047,605
39 : 4,047,258
4,047,268
4,047,276
4,047,338
4,047,348
4,047,393
4,047,463
4,047,481
4,047,537
4,047,547
4,047,578
4,047,582
4,047,598
4,047,612
4,047,630
4,047,659
4,047,716
4,047,734
4,047,748
4,047,750
4,047,759
4,047,764
4,047,828
4,047,829
4,047,840
4,047,881
4,047,919
4,047,946
4,047,967
4,047,981
4,048,027
4,048,041
4,048,140
4,048,227
4,048,230
4,048,254
4,048,255
4,048,257
4,048,261
4,048,281
4,048,344
4,048,383
4,048,389
4,048,402
4,048,403
4,048,413
4,048,418
4,048,427

4,048,433
4,048,476
4,048,487
4,048,533
4,048,545
4,048,602
4,048,619
4,048,630
4,048,649
40 : 4,047,350
4,047,567
4,047,853
4,047,892
4,047,896
4,048,063
4,048,067
4,048,079
4,048,209
4,048,238
4,048,376
4,048,426
41 : 4,047,344
4,047,355
4,047,408
4,047,979
4,048,070
4,048,442
42 : 4,047,266
4,047,275
4,047,340
4,047,386
4,047,429
4,047,508
4,047,548
4,047,560
4,047,596
4,047,602
4,047,654
4,047,655
4,047,660
4,047,725
4,047,733
4,047,763
4,047,782
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DESIGN PATENTS

1	:	245,808		245,811		245,746		245,799		245,748	245,804
4	:	245,792		245,812		245,762	27 :	245,761		245,758	245,805
6	:	245,731		245,813		245,768		245,764		245,759	245,806
		245,743		245,814	19 :	245,763	31 :	245,773	37 :	245,778	47 : 245,770
		245,744	8 :	245,741	22 :	245,739	32 :	245,774	39 :	245,742	245,789
		245,749		245,756	25 :	245,781	34 :	245,737		245,753	48 : 245,766
		245,755		245,810	26 :	245,793		245,760		245,790	51 : 245,782
		245,772	9 :	245,738		245,794		245,767		245,797	53 : 245,807
		245,776	12 :	245,785		245,795		245,791		245,802	245,815
		245,787	13 :	245,757		245,796					
		245,788	17 :	245,745		245,798	36 :	245,734		245,803	55 : 245,786

PLANT PATENTS

37	: 4,105	39 :	4,104				

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